

TEACHING FOR
CRITICAL THINKING

With Emphasis on Secondary Education

Teaching for Critical Thinking

WITH EMPHASIS ON SECONDARY EDUCATION

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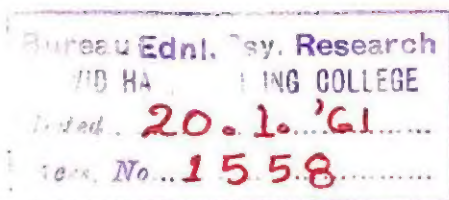


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Preface

Many studies have attempted to examine the qualities of a "good teacher." These studies seem only to agree, as might be expected, that a helpful and democratic attitude is desirable. Research has not proved conclusively that any one technic is preferable to another. The good teacher is strict in the person of Mr. G and lenient in the person of Mr. A. In the person of Mrs. L she lectures most of the time; in the person of Miss B, she usually conducts discussions.

We believe the good teacher, in most cases, has developed his talent through study and effort. It is not his personality, not his strictness or leniency, not the technics he uses or does not use which determine a good teacher. We believe that all talented teachers employ to a large extent a basic method of teaching, whether they are aware of doing so or not. Though it is neither new nor revolutionary we describe this method of teaching for critical thinking to reemphasize that it should find more application in the schools and to point out how its aims may be accomplished.

The talented teacher, as we envision him and as research indicates he should be, is helpful and truly democratic in approach. He has worked through his belief about which aim of teaching to emphasize, and he knows the basic method essential to fulfill this aim, as well as the varieties of approach of which he may avail himself. In these ways he has developed whatever abilities he possessed into evident talent. We have attempted to describe this development by discussing both his aim for critical thinking and the method for achieving it.

This book has been written for teachers and teachers-in-training at the secondary level. But talented teaching is always the same; only the feelings and desires of the students vary somewhat at the different levels. Therefore, nursery, elementary, college, or adult education teachers

in school, industry, the service, may also find stimulating ideas to be considered in relation to their own theories. Our examples are, however, drawn from the secondary school level.

We take here a very strong and definite point of view. It is our intention not so much to convince as to enlighten, not so much to gain agreement as to offer new possibilities. We might say to the reader, "Believe us if you can; disagree if you must; but think and become concerned about the ideas and thoughts presented."

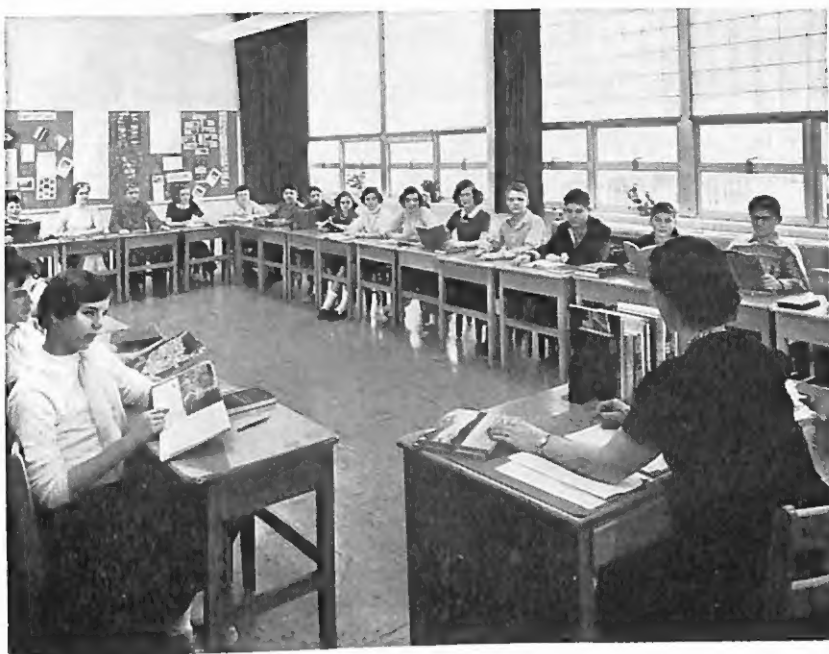
To the talented teacher of the years ahead, then, we dedicate this book. We have attempted to show how we believe his aptitudes may be developed, if he is to be worthy of the title.

C. Burleigh Wellington
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PART ONE



1

A Point of Departure

Method is an old word with a broad application and many definitions. Like any general word, when applied to a particular field it has acquired many meanings and shades of meaning. Nowadays method in education has come to be considered a rather elusive entity which students of education must grasp in order not to be doomed to failure. Such a concept of method is of comparatively recent origin; although Buddha and Socrates utilized methods, they probably thought as little as their pupils about system in teaching.

Today students of education whisper together, saying, "What method does he use?" "His method is autocratic," or "Her method is student-centered." Somehow we have come to believe that study of method will produce teachers who teach proficiently. This statement is true only when qualified with a very large *if*, an *if* that has to do with why and what.

Prerequisite to Method

When we discuss method in education, we are obviously considering a way of teaching. But beginning with the way or technic does not help us to know what we are about. Unless we understand *why* we follow a certain method, we find ourselves in the first crisis suddenly at a loss. The crisis forces us to discard in a hurry whatever we may be doing in favor of something else, equally without foundation.

A teacher was teaching spelling by the "spelling-bee method." After the contest was over, the teacher asked the students to write from dictation the words of the bee. He read, "Separate: sep-a-rate. Definitely: def-in-ite-ly." The students began muttering to themselves and, when asked their difficulty, explained that they could not write the words. Now the teacher knew neither what he was trying to teach (oral spelling, written spelling, syllables) nor why he used a spelling bee. He abandoned the oral contest and adopted dictation to students. Again he had no purpose. The study of method will help to fashion teachers who teach proficiently, who are in truth talented teachers, if they know and can explain clearly why they teach as they do.

If we walk into the farmer's garden and admire his contour plowing, he praises the efficiency of his plow and explains carefully how well it does what it is supposed to do. Then when we inquire about the blades and the driving mechanism, he tells us that they function so as to make plowing efficient, the plowed rows even and scientifically designed. Perhaps we think back to the first plow, to the idea which created it, then on to the improvements over the centuries (at least in our part of the world), and we realize that always the men who built better plows knew what they were trying to do and why they changed their designs. If a new manufacturer were to add a windmill and a parasol to his plow, he would be asked, "Why are you doing that?" and he would need to justify his action. So it is with method. If we add student-centered grouping in a class, for instance, the result may be like the plow with the parasol unless we can adequately account for the addition.

Thus, although we study method, we must begin where all good teaching really begins, with the reasons for doing one thing in preference to another. A way of teaching is a product, the result of something else. It is an outcome of basic thinking about reasons for teaching.

A debate on this topic between 2 students might sound like this. "Miss A is a poor teacher because she always makes the class sit in their chairs at attention and stand at attention to recite."

Asked why this is poor teaching, the first student replied lamely, "Well, adolescents don't like to sit still that way or to stand up to recite. They like things informal."

The questioner persisted, "What if they don't like it? Is that any reason for not doing it? If Miss A teaches successfully that way, how can you say it isn't a good idea?"

"Well," the second student replied in confusion, "you can't teach them that way."

And the questioner continued, "How do you know you can't? If she seems to teach them, you can't say she ought to change her way of teaching."

With this the questioner appears to make a point. As a result of this argument, we may admit that if we start with ways of teaching and attempt to advocate this or that method, ultimately we must stumble unless we possess ready reasons for our choice. Of course some teachers without formal training in education attempt to refute the idea of delving into reasons by basing their answers upon a weak foundation of experience and imitation. "I was taught this way and it worked, so I always use the same approach." Such a basis is obviously tottering and often collapses under pressure. For experience, in its common definition, is the best teacher only if one has a theory or hypothesis to test through experience.

Everyone knows Miss E. She is approaching retirement after forty years of teaching. Experience! She really has had it. But Miss E is a poor teacher; her students learn little or nothing except how to copy word for word and parrot back exactly the French grammar rules which she writes on the board each day. Experience alone is not the best teacher. It may be merely a compounding of first-year errors. It is not a teacher at all unless it is used to help put into practice a given theory. Jane B, who is twenty-two and in her first year of teaching French, is already a good teacher. Jane knew what she hoped to teach, how she hoped to do it, and why she believed certain ways best. Sometimes her theories proved wrong (and the discovery of error is an important part of real experience); then she needed to re-examine and perhaps to readjust the original hypothesis.

We are concerned in this book with the talented teacher who has had his basic aptitudes largely developed through real learning about method. Of course talented teaching cannot be divided sharply from poor teaching; in the evaluation of instruction we find many shades of gray. We shall discuss in this book all those qualities, feelings, and actions which seem to us to add together to make a talented teacher.

We turn now to two situations which may direct our thoughts more specifically to the matter at hand.

Two Classes—Two Ways of Teaching

Teacher A. "All right, class! The bell has rung. Let's settle down and get to the business of the day. Will you please take out your assignment books and copy this assignment for tomorrow as I have written it on the board?" Pause and noise of pages being turned, pencils and pens scraping.

"John, put your math away. This is a history class, and we're not supposed to do other things during the next forty-five minutes."

Pause. The teacher consults his watch, allowing two minutes for the copying.

"You will recall that yesterday I started telling you about the Constitution, and last night you were all supposed to memorize the Preamble to the Constitution and to read the first Article."

He glances up and down the rows.

"Mary. Mary, will you stand and recite the Preamble?"

Mary flutters the pages of her book.

"No, close your book. All right."

"We, the people of the United States . . ."

"That's fine, Mary."

He writes in his red grade book.

"Now, Norman, will you do the same? Please, all of you, be quiet so that we can hear Norman. You will all have to recite this before the class, so you must treat the speaker as you want to be treated. All right, Norman, I guess you can go ahead now."

The same routine continues for eight more students.

"All right, class, tomorrow we shall hear ten more people recite this important part of our Constitution. Are there any questions?"

He glances around quickly.

"For the rest of the period I shall ask you questions about Article 1, and I want your books closed. Everyone take out a piece of paper and write down the questions I ask and the answers I get in reply. I'll tell you if the answer is correct before you write it down. Now, what is the Congress of the United States made up of?"

He pauses and looks around the class for hands.

"Only two of you know this answer? Now come, this was in the very first section of Article 1. That's better! All of you should know this. Jean, you tell us."

"The Congress of the United States is composed of the House of Representatives and the Senate."

"That's fine. I hope none of you will forget this. Write this on your paper, for it will make a good test question for Friday's exam."

He pauses to stare at a boy who is making strange noises in alliance with the boy in front of him.

"How are members of the House of Representatives chosen and what must be their qualifications?"

"Don't any of you know? Who is the Representative from our area? I see some of you are recalling what you read last night. All right, Ronny, suppose you try to answer."

Ronny has not raised his hand and does not know the answer. He shakes his head.

And so the same kinds of questions are asked; the same silence follows; further prompting takes place. The bell peals suddenly.

"Well, class, the time has run out on us again. Tomorrow we'll go on with the rest of Article 1 and consider Article 2, which is part of your homework for tonight. Class dismissed."

Teacher B. As the class bell rings, a student asks from his seat, "Mr. B, may our group on visual aids go to the back of the room and look over some of the materials you have on file to see if they might work into the program we planned on the meaning and values of the Constitution?"

"Sure, Bill, go right ahead. Now who wanted to work with you?"

"Sally, Beth, and Norman will be in my group."

"Oh yes. Sally, Beth, Norman, Bill would like you all in the back right corner of the room to look at some visual aids that may be useful to us in our future class discussions about our Constitution. I'll be back to help you in a minute or two."

He turns to the rest of the class. "Now let's see. Yesterday we were discussing as a class some of the things you might like to know about our Constitution. You remember that we talked about where the Constitution fits into our understanding of the United States government and why you might want to know more about it. Then we discussed what we might do as a class and in small groups or individually in order to find out some of the things we want to know. The visual-aids group is already at work. Do the rest of you know what you agreed to do?"

Lillian raises her hand.

"Lillian?"

"I said yesterday I thought my father would be willing to come to class some day and explain our local city constitution, but when I asked him last night he said he couldn't get away during the day. But he would be willing to take three or four of us to a Council meeting tonight and let us see the original city charter and bylaws."

"It's too bad he can't come, Lillian, but we understand why. Would you like to ask several of the class members to go with you? Then your group could tell the class about it tomorrow or the next day."

Several hands go up, and Lillian picks two other girls and a boy to go with her.

"I'll talk with you later, but right now you need to plan just what you want to find out that will help us in our study of our national Constitution."

The group moves to one side.

"I notice that Barbara has asked to go with Lillian, and if I remember correctly, she asked to chair the art group which was to illustrate the Preamble. It is all right for you to be in more than one group, Barbara, if you think you can handle two jobs."

"I'd like to go to the City Hall, Mr. B, and I'm sure I can handle both."

She leaves the first group.

"The art group did some work last night, and we had just a brief chance in our homeroom this morning to talk about it. We all feel we need to do two things. First we'd like to look through the different history and government books you have at the side of the room for more information about the Preamble and why it was written and who suggested it. This will probably take all of today's class time. Tomorrow we'd like to get a room permit from you to work in the art room

where the materials are available. I've checked with the art teacher and she tells me there will be space for us."

"That sounds fine, Barbara. After class, I'll give you room permits. Why don't you take your group now to the tables by the class library? I might suggest that you also look in the encyclopedia. There is some illustrative work on the back cover."

The rest of the class has already divided into groups which are talking together.

"Phil, I see by the secretary's notes that you, with Don, Bob, and Janet, intend to put on some kind of demonstration to help us understand the ways in which our Congress and President are elected and their powers. Have you had time to talk over your plans?"

"No, Mr. B, we still seem to be floundering around, but we have some ideas."

"All right, Phil, you work with them, and in just a few minutes, I'll be with you to help you."

He turns to the next group.

"Ronny, your group with Jane, Ray, Muriel, and Phyllis asked to investigate the rights you have as citizens now and will have as adults. Have you come up with anything?"

"Well, we should like to act out the various ways our rights might be challenged. We agreed to read the Constitution last night and note each place where the rights of a citizen were mentioned. I think we have quite a list. But that is as far as we've gone."

"You know what you plan to do next, then?"

"Yes, we've already started to plan."

"Fine!"

He moves to the last group.

"Now, Sylvia, your group planned to give us something about financing our government. What have you done?"

"We read the whole Constitution and checked the parts that mention taxation and things like that. It seems rather vague, though."

"In the library section is a book which explains about the taxes which are imposed today. Perhaps that would help."

"Yes. That's just what we need. We can tell the class what the Constitution says and then show them some examples of how it really works."

"Fine! You go ahead, then."

He moves to the front of the room.

"May I have your attention? We have spent fifteen minutes getting organized. We have only a week for our topic. You have divided yourselves into five groups. Bill's group on audio-visual aids will overlap the others, and I suggest that each chairman check with him to see where you may work together. With your five groups you are approaching the Constitution in different ways. Let's remember that you said you wanted most to know the meaning and value of the Constitution for your own personal lives. Keep that in mind as your general aim, for as someone pointed out yesterday, in a few years you will be active, voting citizens, and being a good citizen isn't easy."

For the rest of the period the teacher moves from group to group, investigating the students' thinking and planning, helping them with pertinent questions and suggestions. He considers the reactions of each member of the groups and attempts to help those who need advice. Again and again he reemphasizes the reasons for making the study and the kinds of answers the class members are seeking.

Here are two ways of teaching, each perhaps extreme. In order to criticize or to evaluate them, we are forced to ask, "What are the teachers trying to do? Why do they teach that way?" Here and now, as a starting point, we shall attempt a generalized reply to this question. Teacher A is teaching for information. He believes that the students in the class must assimilate a certain amount of information, that they must cover subject matter; and he offers the material to them as fast as he thinks they can absorb it. Some of the students absorb none, of course, and others very little. Teacher B, on the other hand, is teaching for the use of information in thinking.

A Student in Class B. Let us look further into the experience of one student in Class B. She has heard something about the Constitution, but her concept is vague. In his introductory remarks Mr. B made several points which aroused Jane's interest—one, that the Constitution is the document upon which the whole government rests. "If all copies were destroyed tomorrow," he asked, "where would the country be?" Jane's imagination played on that idea as Mr. B continued, and she remembered a movie about an early culture without laws. Then she listened again, and Mr. B asked, "What rights does the Constitution give you? Are you mentioned there? What about your mother and father? Are they mentioned?" Jane had never before thought of herself and her family in relation to the government.

She thought, "I never realized we are people that the Constitution tells about." Then as Mr. B explained why he thought knowing about the Constitution was important, requesting ideas from the class, Jane raised her hand and heard herself say, "If it really is the basis of our whole government, we can't vote or even have any good ideas about improving our government unless we really know what the base is all about. We need to find out the things that tell us about voting and improving the government."

As all this occurred, Jane was pondering more and more the matter of the Constitution as it related to herself. She was considering its significance for her. She was, in other words, seeing relationships to what she already knew and finding the question to which she needed an answer, "What does the Constitution have to do with me and my family?"

Jane was a member in one of the groups which agreed to read the whole Constitution outside of class. As she read it she considered each new idea in relation to what she had already learned. She passed over certain areas of the Constitution which seemed to have no connection with her own interests. She checked those parts related to citizens' rights, since that was the concern of her committee and since she had already become interested in the importance of this concept in answering her own personal question. After she had read and jotted down some of her ideas, she had learned something about the Constitution. Further learning took place when she returned to her group and discussed the matter with them.

As for the other parts of the Constitution, she listened to and questioned the other group members. Sometimes their ideas opened to her new areas of interest, particularly the art group's thoughts and illustrations of the Preamble. Other areas remained less meaningful to her.

When she read the Constitution for the first time, she started, as her group had decided, with the Bill of Rights. She read Article 1, taking to it her interest in citizens' rights and her anxiety or need to learn about these rights so that she might later perform her duties as a citizen. She thought, "I can go to any church I want, and the Constitution says that no one can stop me. I can read and write anything in all the world, and the Constitution says that no one can stop me. It would be terrible to be in countries where you had to worry every time you went into a church or where you could read only one side of the

story. This helps me in voting because I know that the ideas in our news reports are the way people believe them, and nothing is going to be covered up." And as she thought, she learned.

She read Articles 2 and 3. She thought, "The country can have soldiers if the people want them. But no one has to have soldiers in his house. That's funny! I guess that was in the old days." Because she took personal interest in Article 1, she related the ideas to herself and thought about the meaning. But in Articles 2 and 3 she felt no original need of the idea and therefore gave it no real thought. Unless the ideas in these Articles are reemphasized and she does feel a need for them (other than to pass a test), she will probably forget them. Or they may remain in her mind as a bit of extraneous information, which later, if need is aroused, she may call upon. With these examples as background, we shall consider further the question of what we should teach and of why we should teach it in a certain way.

Thinking

Our first determination must necessarily be *what* we hope to accomplish, that is, our aim in teaching. From this we can decide *how* we shall teach and therefore have an answer to *why* we do as we do. The aim of teaching, then, determines the method. When we turn to a search for an appropriate aim for teaching, the quest moves us to a consideration of thinking.

Acceptable to everyone as an element of the teaching-learning process, thinking is perhaps alone in its exalted position. Some educators consider thinking the ultimate end of all teaching, its final aim; others say it is but a vital part of the total learning process; all agree that it is important.

The following paragraphs, and much of the rest of the book, borrow admittedly from, first, the Lewin-Gestalt psychological approach; second, the Rogers approach to the individual; and third, Dewey's approach to philosophy, although the authors do not comply exactly with any or all of these approaches. Some areas of real disagreement prevail. "Not to be certain of our conclusions, not to hold our views in a rigid manner indicates a mature philosophy of life and history."¹ The

¹Frederick Mayer, "Education for Wisdom," *Phi Delta Kappan*, vol. 35, pp. 133-136, December, 1953.

naïveté of claiming all answers or all knowledge we have attempted to avoid.

Levels of Thinking. It is obvious that thinking goes on all the time. The teacher may be certain that all of the students in the classroom are thinking. However, the kinds of thinking in which they are indulging and the content of their thoughts are often unpredictable. Some psychologists divide thinking into several levels including, for example, reverie or daydreaming, perception, insight, memory, imagination, recall. None of these, by itself, is considered a high level of thinking. If the student daydreams about his great plays on the basketball court the preceding evening, if he is asked which is the largest river in the United States and he replies the Mississippi, if he hears a story about Hannibal's trip across the Alps and forms a picture of it in his mind, he is engaging in forms of thinking.

However, "the most exalted of all the psychological functions is the thinking out of the solutions of problems."² This function is variously called thinking, reasoning, creative thinking, productive thinking, or problem solving. Without extensive background the teacher cannot predict that students will engage in this kind of thinking, which involves many if not all of the lesser kinds of thinking mentioned above. The imperative question about thinking is not whether a student imagines, remembers, or perceives—for in order to reason he must engage in all of these processes—but to what extent the teacher is to be satisfied with only these.

Hilgard demonstrates that in some form problem solving is considered an essential part of learning by all psychologists, though they may define the process with some differences.³ Brubacher, in a comprehensive study of educational philosophers, says that they commonly endorse the problem method. "Indeed so important is training in problem solving that many advocate the problem method where answers are already well known in advance."⁴ Reasoning, then, is universally accepted as the most important form of thinking, essential to the teaching-learning process.

² Howard L. Kingsley, *The Nature and Conditions of Learning*, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1946, p. 369.

³ Ernest R. Hilgard, *Theories of Learning*, 2d ed., Appleton-Century-Crofts, Inc., New York, 1956, pp. 10-11.

⁴ John S. Brubacher, *Modern Philosophies of Education*, McGraw-Hill Book Company, Inc., New York, 1950, p. 329.

Teaching the Thinking Process. Though the teacher may well agree that reasoning, or problem solving, is desirable, he may wonder about its place in the classroom and about the possibilities for teaching it. Some limitations must be admitted at the outset before his question may be answered. Several other ways prevail in which the teacher may create some forms of learning in his students. Sometimes the teacher may feel that "overlearning" ("facilitation of response with repetition after the essential learning has been mastered")⁵ is necessary. In this way, some psychologists believe, skills may be developed—though Lewin notably disagrees. Sometimes simple "conditioning" may be deemed necessary by the teacher; for instance, he may insist repeatedly that pupils begin reading top-left. Some teachers may find occasions when "imposing" standards and subject matter by the adult upon the young people is desirable. Dewey and his followers oppose such learning.⁶ In spite of these three possibilities, where some learning occurs, the great need of the teacher is for understanding how to teach so that the learner will begin to reason. Hopkins explains this situation when he says that every individual learns some things while under control and direction, but that the conditioning conception of learning is too incomplete.⁷ In other words, we need increasing emphasis upon forms of teaching which will ensure in students active reasoning, not absorption.

To discover how such teaching may find its way into the classrooms of the nation is the task for the chapters ahead. This is the aim of teaching with which we shall be concerned. Wherever the teacher aims to promote the highest form of thinking, he must, by definition, make certain that his class engages in problem solving. If at times his aim is other than for the highest form of thinking, he will use other approaches. We shall not be concerned here with the latter because of the real need for greater emphasis on thinking by students. We therefore proceed with high-level thinking as the aim of teaching for which we shall attempt to indicate a method.

⁵ Hilgard, *op. cit.*, p. 472.

⁶ John Dewey, *Experience and Education*, The Macmillan Company, New York, 1956, p. 4.

⁷ L. Thomas Hopkins, *Interaction: The Democratic Process*, D. C. Heath and Company, Boston, 1941, p. 139.

The Process of Thinking. Psychologists agree that reasoning is a process involving several steps, which have been variously classified and which usually range from three to six steps. Hilgard, who divides psychologists roughly into two groups, shows that the difference between these two groups lies not in their acceptance or rejection of problem solving but in the method by which they arrive at the solution, whether through trial and error (the stimulus-response psychologists) or through a perceptual structuring leading to insight (the cognitive psychologists).^a However, the two groups agree essentially about what the learner does.

For the sake of clarity we shall define the steps of reasoning, borrowing from Dewey and others, as feeling a need for an answer, defining the difficulty, discovering ideas and information necessary for a solution, forming a hypothesis, deciding where the findings apply to future learning. Now this process may be so rapid that introspection will perceive it as totally eclipsed. Or the difficulty may be so great that the individual will move only slowly and painfully from the first step to the second, and possibly may be unable to form a hypothesis acceptable to himself.

Reasoning takes place, in other words, when the individual says, "Shall I wear the yellow or the brown tie?" and answers himself immediately, "I'll wear the yellow one." He feels the need to choose the correct tie; he defines his problem as stated; then quickly he realizes that the yellow tie matches his socks; he hypothesizes that since it matches his socks, it is the correct tie; he selects it, and his choice may be verified when someone comments on its appropriateness. Here is a simple form of reasoning.

More complicated forms of reasoning show the steps of the process more clearly. The question, "Would the United States be well-advised to agree to disarmament?" entails all the kinds of thinking and probably long deliberation before the formation of an appropriate hypothesis. Thinking, or reasoning, then, is a process involving five subdivisions which are an integral part of its wholeness.

The Place of Information. If several forms of thinking, such as memory and perception, are essential to reasoning or problem solving, it is obvious that information is also essential. One must remember,

^a Hilgard, *op. cit.*, pp. 10-11.

however, that while he cannot reason without facts, "the mere possession of facts does not guarantee their use in reasoning."⁹

Information and facts have been relegated to a low position in education, and rightly, because they are so often misused. As we observe many classes and talk with teachers and administrators, we are impressed with one thought which pervades much of their thinking about teaching—"We've got to cover the material! We have to get through the book, you know." We are prompted to ask why. Why must you cover the material, cover the book, get through the syllabus? And always they answer, "Well, the next teacher expects that the pupils will have had that much," or "The students have to pass the College Boards or the Regents or the departmental examinations." So we teach upon a treadmill where outside expectations set us the awesome task of "covering the material, covering the book, getting through the syllabus." And always the first emphasis must then be upon information.

In the first place, information is a nebulous thing. Who is to say what is information? Much of what is taught is presented as gospel, as universally accepted information; yet we venture the opinion that a large part of this information is highly questionable, that experts could be discovered who would disagree with the information and thus prove it controvertible. Most information is questionable; most of what is presented as information is in reality founded upon someone's attitude. An attitude may be defined as a belief, prejudice, bias, which is not necessarily relevant to known facts. Allport's definition, generally accepted by psychologists, calls it a state of readiness "exerting a directive or dynamic influence upon the individual's responses to all objects and situations with which it is related."¹⁰

"In a plane only one line can be drawn through a point parallel to a given line."

"*It is me* is wrong."

"The translation for the word describing Mary in the book of Matthew is virgin."

"The law of gravity can never be refuted."

"Columbus discovered America."

⁹ James M. Sawrey and Charles W. Telford, *Educational Psychology*, Allyn and Bacon, Inc., New York, 1958, pp. 99-100.

¹⁰ Gordon W. Allport, "Attitudes," in Carl Murchison (ed.), *Handbook of Social Psychology*, Clark University Press, Worcester, Mass., 1935, p. 810.

Here are statements which seem to be pure fact. Yet every one is false or debatable.

Because much information is presented as fact, the student fails to draw any distinction between attitude and fact. Even if a teacher were able to demonstrate that everything he teaches was fact, still his attitude would be strongly in evidence just in the choosing of one fact in preference to another. Glancing through a book about the American Revolution written and printed in Canada, a citizen of the United States might feel certain he was reading about some other battles. The book presents information, but it makes a choice of information, just as do history books written by Americans. Even the most objective scholar must employ certain criteria for choice; he cannot include every fragment of information which he unearths in his research.

In the second place, let us realize that if a certain body of information, a certain book, a certain syllabus, is presented to students in order that the next teachers may find them well primed, it is a vast assumption that the students have "learned" the material. Because a book is covered in a history class it does not follow that the next fall, when the students move from ancient to modern times, they will remember very much about the ancient. Even those students who score at the top on departmental examinations may retain little of the information which they memorized so perfectly in preparing for the test.

Furthermore, we must realize that a great deal of information offered is not accepted. A student must act, be personally involved, in order really to learn. If he is not stimulated to act but only to memorize, most of what he memorizes will soon be forgotten. Even the parts that he retains will remain irrelevant bits of information unless he reacts to them. "All learning is essentially creative experiencing in which the learner, under guidance, evolves goals, formulates and executes plans, evaluates results, and incorporates accepted learnings into his value and attitude system to act with and upon in subsequent experiences."¹¹

For instance, a college student once was attempting to help a young brother with his geography. The college student had memorized, "The

¹¹ Thomas Hopkins and others, *Integration: Its Meaning and Application*, Appleton-Century-Crofts, Inc., New York, 1937, p. 195. Reprinted by permission of Appleton-Century-Crofts, Inc.

earth is round," just as thousands of other students have done. So he told his little brother, "The earth is round. That's the way it is, even though it looks flat when you stand on the plains and see flat land stretching out on all sides of you."

"Yes," said the younger brother, "but where do the people stand?"

"They stand on the flat part, I guess," said the college student, and he realized that he had never asked that question and that for years he had held some vague idea that the inhabited earth ran straight through the middle of the globe he had seen in school. "Gosh," he said, "I always thought they drew the map on the surface of the globe because they couldn't draw it in the middle. I didn't realize people actually live on the outside of the earth, even upside down. I really thought they lived on something flat. And now I understand about gravity, too." And with this dawning realization he began to perceive that the earth is round, although for years he had been saying so.

Finally, we must accept the fact that not all students can possibly be expected to learn the same thing. One idea will meet one student's need but not another's. Real learning will be attained only in the areas in which need is felt. Notice how Jane understood and learned Article 1 of the Bill of Rights but lost completely Articles 2 and 3. Now teachers may as well face this situation. In Class A the teacher does not know that students differ, though we imagine that he would say, "Of course I believe in individual differences." But saying a thing, and believing and acting upon it, are two very different things. That is precisely what we have been trying to point out here. In Class B the teacher actually recognizes that students are sure to learn differently and to retain different facts or concepts.

As a summary, then, let us say that if we expect students to learn information, to be able to use and apply it, then we must teach for their personal interaction with information.

Facts and information in the last analysis are generalizations. Brownell and Hendrickson explain this situation in discussing the statement, "Water flows downhill, not uphill." If an adult were to explain the statement, he would immediately disclose the many meanings and relationships included but hidden in the expression. Putting the thought into the simple statement and thus making it a generalization does not rid it of meaning; it merely conceals the meaning. "All

too commonly we accept imperfect learning on the part of those who master only the language in which 'facts' are expressed without having first engaged in the experiences which alone can make the 'facts' vital and functional parts of their knowledge."¹²

Outcomes of Thinking or Reasoning

Although the psychologist is qualified to determine the values or aims presently held, he is not competent, in his role as scientist, to decide whether "existing aims or values are good ones, the ones the schools *ought* to have." For this judgment he needs philosophy.¹³ In like manner, when a person follows through the steps of thinking, he utilizes all facts and information available, but at the point where he formulates a value judgment he turns from science to philosophy.

"At no stage can a scientist, in his function as such, ever say of anything, 'this is good, this is evil.'"¹⁴ A student feels concerned about social security legislation, and he wants to learn whether he should support the trend for its continued increase, particularly in a politically democratic country. He looks for evidence, forms the hypothesis that a point exists beyond which Social Security is incompatible with political democracy, and then considers how this learning may lead to future learning. When finally he decides, "I should take steps against this trend when it arrives at the danger point I have set," he has formed a value judgment in terms of what is good and of what ought to be done by him—and sometimes by others—though the teacher needs to make him aware that obligations vary.

While it is true that the forming of a hypothesis is a value judgment in general terms and that the final value judgment in any case is hypothetical, the emphasis on the outcome of reasoning should be upon a personalized value judgment. There the student declares, if possible, "I ought to . . . , and I will do this now or in the future." His own behavior is therefore involved. Sometimes he adds, "People ought to

¹² William A. Brownell and Gordon Hendrickson, "How Children Learn Information, Concepts, and Generalizations," *Learning and Instruction*, in Nelson B. Henry (ed.), *Forty-ninth Yearbook of the National Society for the Study of Education*, University of Chicago Press, Chicago, 1950, part I, p. 97.

¹³ Brubacher, *op. cit.*, p. 11.

¹⁴ Edgar A. Brightman, *A Philosophy of Religion*, Prentice-Hall, Inc., New York, 1940, p. 85.

. . . ,” but he must be well aware of the implications in so deciding. Or he says, “I firmly believe. . . .”

Outcomes of thinking are defined in most general terms by psychologists. Hilgard says that the outcomes of what is learned are differently defined by two psychological groups, the stimulus-response group declaring the outcome of learning to be habits, the cognitive group calling the outcome “cognitive structures.”¹⁵ Philosophers, on the other hand, are concerned with the values implicit in the outcomes of learning. Putting the two together, and making the assumption with the cognitive psychologists that, in at least higher forms of thinking, “cognitive structures” follow from the steps of thinking, we may say that the thinker becomes the philosopher when he formulates value judgments about these cognitive structures, and when he is willing to show by his actions that he considers them pertinent and right.

It is at this point that the interaction of the thinker with the matter of his thought—with his environment as Dewey defines it—becomes crystallized. Hopkins, who defines this process as Dewey does, describes how an individual reacts with a situation in his environment so that a change occurs both in him and in the situation.¹⁶

Thus the individual must make use of his thinking, forming a value judgment which he realizes is hypothetical but which he is willing to accept.¹⁷ This outcome of learning appears to coincide with the generally accepted psychological principle that active participation of the learner is preferable to passive reception,¹⁸ and with the wide agreement among philosophers, cited by Brubacher, on the theory that the student should be free to experiment.¹⁹

Dewey once wrote that the kind of person we hope to build through education is one who not only has good intentions but who insists on acting upon them.²⁰ The learner says, “I have felt a need to know about the best way to treat others. I have perceived the relationship of

¹⁵ Hilgard, *op. cit.*, p. 10.

¹⁶ Hopkins and others, *Integration: Its Meaning and Application*. Appleton-Century-Crofts, Inc., New York, 1937, pp. 19–20.

¹⁷ Lewis W. Beck, *Philosophic Inquiry*, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1952, pp. 222–223.

¹⁸ Hilgard, *op. cit.*, p. 486.

¹⁹ Brubacher, *op. cit.*, p. 334.

²⁰ John Dewey, *Moral Principles in Education*, Houghton Mifflin Company, Boston, 1909, pp. 49–50.

the new experience to what I already knew. I have learned that the Golden Rule is the best way for me. Now I have made a judgment." If the learner then believes his own statement, he has truly reacted and will take action proving that he values his decision, that it is now *his* judgment. If he takes other action, he really values something else more, perhaps the principle of treating others as they treat him. This eye-for-an-eye thought, then, is his real judgment.

Reasoning which results in a value judgment is termed by many "critical thinking" and is an aim of education which everyone accepts. "Critical thinking, then, is evidently the desired integrating principle or goal of education."²¹ For many philosophers it is not the ultimate aim. But whether preparation for eternal life, self-realization, or merely more learning is the ultimate aim, reasoning which results in judgment, that is, critical thinking, is universally acceptable.

That judgment is inherent in critical thinking and that the latter is developed by and through reasoning are conclusions generally accepted by philosophers, including logicians. Black shows that reasoning is the background of critical thinking. He writes, "A critic . . . is able to give reasons for his favorable or adverse judgments. . . . His judgment is grounded in knowledge of principles and standards appropriate to the subject matter."²²

Learning

Psychologists are the first to admit that no satisfactory definition of learning has been discovered. Even an acceptable theory of learning remains for some future time to propose. Hilgard says, "It is satisfactory to continue to mean by learning that which conforms to the usual socially accepted meaning that is part of our common heritage."²³

Some learning takes place in the classroom, then, in most situations. Imitating, memorizing, repeating, conditioning—all may cause some kinds of learning. But the level of thinking involved is usually not reasoning. We have said that at times the teacher may wish to utilize some kinds of teaching involving these forms of thinking. Furthermore,

²¹ Paul L. Dressel, "Critical Thinking," *NEA Journal*, vol. 41, pp. 418-420, October, 1955.

²² Max Black, *Critical Thinking*, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1946, pp. 6-7.

²³ Hilgard, *op. cit.*, p. 6.



in the classroom "incidental learning" may often occur—"learning which apparently takes place without a specific motive or a specific formal instruction and set to learn the activity or material in question."²⁴ Ten years after studying Donne a student might see in his reading

Go and catch a falling star,
Get with child a mandrake root,

might recall that Donne wrote the lines, and might perhaps be able to repeat them, though after ten years he might still have no idea of their meaning or significance. Here are incidental learnings. While at some future time the student may be able to call upon such incidental residues of learning and utilize them in the process of reasoning, the teacher cannot be concerned with them in the teaching-learning process because they are, by definition, unpredictable.

Since reasoning is the most acceptable form of learning, and critical thinking the aim of teaching with which we shall be concerned, we turn to the teaching which ensures learning through reasoning and critical thinking. The other kinds or levels of learning will be left to the teacher's choice and discretion.

Research on reasoning is notably lacking. Many of the studies of learning are based upon simple retention by human beings or upon problems solved by animals. Hilgard points to the need for studies which emphasize a subject's ability to use past experience in facing new problems, to maintain motivation until a problem is solved, to gain confidence in himself as a creative person, and to learn how to diagnose a problem, how to fill the gap in necessary knowledge, and how to call on experts.²⁵

Further difficulties are pointed out by Tilton who says, "Differences in data, in purpose, and in the language used have been mentioned as in part responsible for the variety found in explanations of learning."²⁶ Until these difficulties are resolved, teachers must content themselves with setting their own aims and using existing research for the means to attain them.

²⁴ John A. McGeoch and Arthur L. Irion, *The Psychology of Human Learning*, Longmans, Green & Co., New York, 1952, p. 210.

²⁵ Hilgard, *op. cit.*, p. 488.

²⁶ J. W. Tilton, *An Educational Psychology of Learning*, The Macmillan Company, New York, 1951, p. 13.

Method and Aim

Method grows out of a basic concept of aim. Knowing what he wants to accomplish generally, the teacher may then consider specific purposes, and finally decide *how* best to do what he desires. At this point he can adequately evaluate his motives. A basic understanding of where one is going in teaching is essential to the establishment of a method which is really workable for any given teacher. Then, when a problem arises, the teacher uses his aim as a criterion for deciding what he ought to do and how he ought to do it.

The specifics which one hopes to accomplish will be far more likely to vary with each teacher than will the general over-all aim. An article in the *Saturday Review* phrases it this way, "Ask a group of people what are the proper goals of education and you will come up with almost as many goals as people you query."²⁷

This seems to be a perennial problem. Aristotle said that everyone does not agree as to the things they would wish a child taught, both with respect to advancement in virtue and a happy life; nor is it clear whether the objective should be to improve reason or rectify morals, whether to instruct a child in what will be useful to him in living, or what leads to virtue, or what is excellent.

Since there is sure to be little or no agreement as to the specifics which ought to be taught, each teacher will need to consider them for himself. A decision about them should follow, not precede, a discussion of method. For instance, the specific curriculum is so debatable that no agreement is to be expected nor really to be desired, since through different choices by different teachers students are exposed to varying points of view. Possibly the matter of choice is not so important as some people suppose. If the student is led to reason, that is, to interact with the information to which he is exposed so that he can use it, then he will eventually discover the kind of information he needs.

* * *

The method, then, follows from the aim, or at least from the general aim (reasoning toward judgment). Finally, a student is led to

²⁷ "Education Has Many Purposes," *Saturday Review*, vol. 38, p. 17, Sept. 10, 1955.

become, as Emerson says, "man thinking," not a "mere thinker" or a "parrot of other men's thinking."

Because we wish to be consistent, we admit readily that our position on this matter is not necessarily to be accepted by the reader. On the other hand, we have hoped to promote thinking, to stimulate interest which will lead to critical thinking. The fact that the reader's judgment may differ from ours bothers us not at all.

LEARNING MATERIALS

Some Cases

1. A student in seventh grade wrote a paper on flowers. About the iris he said, "They hold their heads high as though they are as important as their relations, the orchids, but they blush dark because they know they aren't." The teacher drew a line through his sentence and wrote, "Please give genus, color, time of blooming." How does this teacher define his aim of teaching?

2. "These boys and girls just can't remember from day to day the grammar rules I teach them," the teacher remarked. What, in this statement from a ninth-grade French teacher, shows her views about critical thinking?

3. Recently we visited a Latin class. After the teacher had lectured and asked questions about one of Caesar's campaigns, we requested permission to pose a question to the group. When we asked, "Do you think Caesar planned this campaign as well as a modern general would, and if you had been planning it, could you have done better?" silence followed until one boy said, "That isn't a fair question. We haven't had that." What has this student learned from his teachers about the definition of a student's judgment?

4. The teacher said, "These are the facts. Please take these down in your notebooks. Always place a comma between the items of a series." What is the teacher's concept of facts or information and of their place in learning?

5. The science class was studying evergreen trees. The teacher asked questions, called on class members for replies, put down grades in a red book. To Martin, who said, "The evergreen is a verdant plant in all seasons because it retains its chlorophyll," she gave A even though, if she had asked him, he could not have defined *verdant* or *chlorophyll*. To Barbie, who said, "Evergreens make beautiful patterns if you lie underneath and look at the sky," she gave F. What is the teacher's definition of thinking and judgment?

Some Controversial Thoughts

1. We must beware of "inert ideas" which "are merely received into the mind without being utilized, or tested, or thrown into fresh combinations."²⁸

2. "Our most important opinions . . . are . . . rarely the result of rea-

²⁸ A. N. Whitehead, *The Aims of Education and Other Essays*, The Macmillan Company, New York, 1929, pp. 1-2.

soned consideration, but of unthinking absorption from the social environment in which we live."²⁰

3. "The whole aim of good teaching is to turn the young learner, by nature a little copycat, into an independent, self-propelling creature."²⁰

4. Whenever we put empty words into a child's mind and impress them on his memory, as though they were knowledge, or means of acquiring it, we are obviously forgetting that life is a teacher."²¹

5. "Learning is the tendency of any part or phase of what one has lived so to remain with the learner as to come back pertinently into further experience."²²

6. Teachers will observe that "the average product of our elementary and secondary school system is filled with unexamined verbal clichés and that he cannot speak or think clearly or logically."²³

Suggestions for Further Reading

1. Burton, William H.: *The Guidance of Learning Activities*, Appleton-Century-Crofts, Inc., New York, 1952. Chapter 5, "Widespread Misconceptions Concerning Learning."

2. Guthrie, E. R.: *The Psychology of Learning*, Harper & Brothers, New York, 1935. A study of learning of the stimulus-response group.

3. Henry, Nelson B. (ed.): *Philosophies of Education*, Forty-first Yearbook of the National Society for the Study of Education, Part I. University of Chicago Press, Chicago, 1942. A discussion of the aims of education in terms of various philosophical approaches.

4. Morse, William C., and G. Max Wingo: *Psychology and Teaching*, Scott, Foresman and Company, Chicago, 1955. Chapters 11 and 12, "Guidelines for Learning; Ways of Learning."

5. Vinacke, W. Edgar: *The Psychology of Thinking*, McGraw-Hill Book Company, Inc., New York, 1952. A detailed psychological approach to thinking.

²⁰ James Harvey Robinson, *The Mind in the Making*, Harper & Brothers, New York, 1921, p. 61.

²⁰ Jacques Barzun, *Teacher in America*, Little, Brown & Company and Atlantic Monthly Press, Boston, 1945, p. 21.

²¹ Johann H. Pestalozzi, "The Swan Song," in J. A. Green (ed.), *Pestalozzi's Educational Writings*, Edward Arnold & Co., London, 1916, p. 293.

²² W. D. Kilpatrick, *Philosophy of Education*, The Macmillan Company, New York, 1951, p. 239.

²³ Nathaniel Cantor, *The Teaching-Learning Process*, The Dryden Press, Inc., New York, 1953, p. 47. Reprinted by permission of The Dryden Press, Inc.



2

Problem Solving and Judgment

It is the task ahead to discover more precisely the ways of teaching which will promote learning through reasoning and judgment, since this is the approach most often used by the talented teacher. A more complete discussion of this process and what is involved for the teacher follows. Problem solving may be a formalized type of learning. It is not necessarily so. A teacher who asks, "Is it right for a person under sixteen to learn to drive if the state law says that no one may take the wheel before that age?" will very often call attention to a problem which needs solving. Of course not all students will be automatically and immediately interested. Some will not hear; others will not care. It may take many attempts before the student realizes that the teacher is helping him by suggesting problems. Not every area of learning will hold interest for all students in the class at one time. Those who define the problem personally and then move forward, either together or alone, to find answers, will engage in reasoning.

A Description of Problem Solving

Problem solving has evolved from the necessity ever with us to make decisions. Young people face decisions many times each day, often solving them only haphazardly or by thoughtless trial and error.

Robert Frost has given a poet's definition of problem solving.

Two roads diverged in a yellow wood,
And sorry I could not travel both
And be one traveler, long I stood
And looked down one as far as I could
To where it bent in the undergrowth;

Then took the other, as just as fair,
And having perhaps the better claim,
Because it was grassy and wanted wear;

.....
Two roads diverged in a wood, and I—
I took the one less traveled by,
And that has made all the difference.¹

Here the problem has been defined. Only two possible choices exist, though in other situations there might be many. And the problem is solved, with good reason for the choice, and with the realization that "that has made all the difference."

For a more psychological description of problem solving, we turn to Lewin's theory that a problem situation represents an "unstructured" (unmapped) region of life space. The individual does not know how to go from the givens (things granted or assumed) to the goal. He thus feels insecure until the region becomes structured (organized) so as to permit problem solution. At this point he has learned.² Lewin conceives of the "life space" as the person and his environment as he himself sees it. It is structured if it seems familiar and understandable, unstructured if new or confusing. The need for this life space to be structured is emphasized by Lewin: "All behavior depends to a large degree on the cognitive structure of the life space. In an unstructured,

¹Robert Frost, "The Road Not Taken" from *Mountain Interval*. Copyright 1916, 1921, by Henry Holt and Company, Inc. Copyright, 1944, by Robert Frost. By permission of the publishers.

²Ernest R. Hilgard, *Theories of Learning*, 2d ed., Appleton-Century-Crofts, Inc., New York, 1956, pp. 273-274.

or new, situation the person feels insecure because the psychological directions are not defined; in other words, the person does not know what action will lead to what result.”³ Thus as the life space becomes structured, the problem is solved. The person moves, in other words, from “an unstructured region” which “usually has the same effects as an impassable obstacle,”⁴ to a situation where the individual and his perceived environment has a large degree of cognitive structure.

It is not the intention of this section to discuss the history of problem solving. For a historical approach and the theoretical background, the works of Johann Herbart,⁵ John Dewey,⁶ and Max Wertheimer⁷ are basic, as well as many of the writings of E. C. Tolman and E. L. Thorndike.

Problem solving involves several steps as the student progresses from interest to hypothesis, the steps being the process of reasoning. First, he feels a need (Dewey), an interest (Thorndike), an anxiety (Buzelski), for learning or finding out something. The teacher in a seventh-grade geography class asks, “If you won a contest and were offered as prize a trip to New Orleans or San Diego, which would you choose? In this unit on Southern cities, we ought perhaps to decide to which of the many cities we should most like to go. If our high school football team wins their next game, you know they will be going to Jacksonville. Would you like to go along? Maybe you will be moving or traveling. I wonder how you would decide which kind of city you would like best.” The student who has never left home and never wants to has little interest here. Others do not care, because New Orleans, San Diego, and Jacksonville seem far away. The student who is to move or travel, the potential football player, and the adventure-some youngster feel immediate interest.

Whether or not the teacher has phrased a problem for the total class depends upon the number who realize a need. The teacher judges their feelings in the matter by their comments. Through offering a number of problems each time, then allowing the class to discuss and

³ Kurt Lewin, *Field Theory in Social Science*, Harper & Brothers, New York, 1951, p. 74.

⁴ *Ibid.*, p. 255.

⁵ Johann F. Herbart, *Outlines of Educational Doctrine*, The Macmillan Company, New York, 1901.

⁶ John Dewey, *How We Think*, D. C. Heath and Company, Boston, 1910.

⁷ Max Wertheimer, *Productive Thinking*, Harper & Brothers, New York, 1945.

add to them, he may arouse many class members to interest through one problem or through several. Some students feel the need immediately; others take more time before they become conscious of their need to study the topic.

Once a student feels an anxiety, he becomes disturbed and wants to discover answers. The *second step* is to guide students to determine which problems they should pursue and how—whether as a total group, in small groups, or individually, according to the number who feel a need to solve the problem. This step, then, is the defining of the problem or problems.

In the geography class, George, whose aunt lives in Houston, defined one problem—"I want to know whether it would be worse to live in a Southern city like Houston and put up with bugs and snakes, or to live here in the North and put up with winter."

A second problem was defined by a student whose father travels extensively—"Are the big Southern cities alike in a lot of ways or different?"

Another problem was phrased thus, "I don't care what these cities are famous for. All I really want to know is whether I should like to travel there or live there." If the teacher knew that the class had omitted a vital problem, he himself would submit it for consideration. As the problems are being defined, the students must be helped to define also what they already perceive in relation to them. A person can perceive something only in terms of the perceptions (meanings) that he, as an individual, can recognize in it.⁸ Students will often speak of their previous learning automatically, but if they do not, the teacher must help them to recall it.

In deciding on possible ways to solve the problems mentioned the teacher assisted the class to establish criteria. For example, in the first problem whether it would be worse to live in the North or in the South, they listed the positive and negative qualities which might be found in either area. Finally they realized that they must study further to discover other aspects of the regions. In the second, they listed many criteria for determining likenesses of cities—size, location, climate, assets, and other special features, such as universities and libraries.

⁸ Arthur W. Combs, "Intelligence from a Perceptual Point of View," *Journal of Abnormal and Social Psychology*, vol. 47, pp. 662-673, July, 1952.

When the criteria were established, the *third step* followed. This is the carrying out of research or experimentation. The class divided into three subgroups to continue with necessary research to solve the problems established. It was agreed that the members of each group would present their answers to one of the problems with every shred of evidence they could find for verifying the answer.

The *fourth step* was further pursuit of the solution to the problems through a general discussion in the light of all new evidence presented. Each class member attempted to form a tentative hypothesis about the three questions. These were discussed, and finally the teacher summarized. If the students had further doubts, they could undertake more research.

The *fifth step* is related closely. It is identical with a final step described by T. L. Kelley as an appraisal of the solution in the light of future needs.⁹ It consists in considering the knowledge and its place in relation to other learning. The teacher might rephrase his original questions, or ask, "What do you know about the Southern cities of our country? What good will this knowledge do you? How are you going to decide whether your ideas in answer to the class problems are really right? What will you do with your new hypothesis?" With this final discussion and summary, as each student voices or writes his own hypotheses, the last step in problem solving has been taken.

It must be noted that these steps are not mutually exclusive. Newly felt needs, particularly, arise at all stages of problem solving. New ideas arouse new anxieties. Various steps may at times be combined: for instance, steps 3 and 4, that is, discovering other students' information and opinions while attempting to form one's own hypothesis; steps 4 and 5, that is, forming a hypothesis and seeing its relationship to other learning and future learning. Step 5 may also be a time for consideration of technics used to arrive at hypotheses or conclusions as well as of the kinds of knowledge arrived at. Sometimes helping the students to review the steps of problem solving may enable them to understand the process more clearly and to tackle further problems in a more adept manner.

The actual learning or tentative hypothesis arrived at by the student is, of course, not the only value to be derived from problem solving.

⁹T. L. Kelley, *Scientific Method: Its Function in Research and in Education*, The Macmillan Company, New York, 1932, p. 24.

As we said previously, bits of information and partial concepts of new ideas may be unconsciously retained. Many small personal problems may arise and be solved through consideration of information and ideas,—all of this in addition to solving problems in the classroom. Other related values, such as faith in one's ability to solve problems, understanding of oneself and others, will necessarily result when, for example, the student defines to himself a problem about his own ability, or the teacher asks a question which arouses anxiety in him and causes him to phrase such a problem.

CHART 1. The Process of Critical Thinking

1. *Anxiety*—Become Aware of Anxiety.
I feel this difficulty and perceive how it relates to what I already know.
2. *Definition*—Decide Which Problem to Pursue and How.
Is this my problem? Shall I solve it alone or with others? What do I need to help me learn?
3. *Research*—Carry Out Research—Experimentation.
I read, listen, manipulate equipment and symbols, travel, and talk.
4. *Hypothesis*—Hypothesize in Light of New Evidence.
I discuss or write about findings.
5. *Appraisal*—Appraise Findings in Light of Future Needs.
I consider where my hypothesis fits past and future learning.
- Judgment*—Make a Personal Judgment with Commitment to Action.
I ought to do this and I will do it.

After hypotheses have been formed and considered in the light of needs for further learning, the student moves from problem solving, or reasoning, to judgment. Here he becomes the philosopher engaged in critical thinking; here he truly may be said to interact with his environment. At this point the student engages in deduction by judging the particular conclusions of the particular discussion. Whatever his judgment, as, for example, "If I lived in New Orleans, I should work in favor of retaining segregation," he has formulated a judgment upon which he is committed to act. At the same time that he makes a commitment or value judgment, the student must be helped to realize that future evidence may intrude to force a change or alteration in

judgment. Thus critical thinking even at this stage must be understood as hypothetical.

We agree, then, with Childs who wrote that "growth through experimental inquiry may be contrasted with learning from sheer trial and error, with slavish adherence to tradition and precedent, with reliance on external authority, with random activity, with all forms of wishful thinking, as well as with memoriter processes in which learning is construed as a passive acquiring for the purpose of the mere re-citing of prescribed lessons."¹⁰

Evidence in Support of Problem Solving

Problem solving is so important that it ought to be used far more frequently in the classroom than it is at present. It ought to be the chief approach of the talented teacher. It is neither the only form of thinking nor the only form of learning, and thus it is not the only way to teach. But because of evidence in its favor, much of the teacher's time should be spent in promoting learning through problem solving and judgment.

We have said that the steps of reasoning are the same as the steps of problem solving. Dewey corroborates this statement when he writes that thinking is problem solving.¹¹ However, when the person-reasoning becomes the problem solver in a more formal situation, such as the classroom, no claim may be made that the two forms of mental activity are absolutely identical. It is obvious, nevertheless, that since the steps of reasoning (even the quick decision to wear the yellow tie) and of problem solving (as in the discussion about Southern cities) are the same, use of problem solving in the classroom most closely approximates the reasoning which psychologists and philosophers esteem.

As he engages in problem solving and judgment, the student most closely approximates the democratic process. Brubacher says that philosophers generally agree about the importance of the dignity of the individual, respect for human personality, and freedom for experi-

¹⁰ John L. Childs, *Education and Morals*, Appleton-Century-Crofts, Inc., New York, 1950, p. 160.

¹¹ Dewey, *op. cit.*, p. 72.

mentation, and that these tenets are in line with the principle of democracy, that individuals should freely manage their own affairs.¹²

Other evidence is summed up in a composite report edited by Fersh on psychological studies of problem solving, which states that recent psychological findings about learning, transfer, the importance of purpose, awareness of significance, and personal involvement in implementing study, as well as about their value in gaining improved retention, have reinforced many teachers' beliefs in the value of problem solving. Furthermore, "most studies which have compared the problems approach with other forms of curricular organization claim not only that problem solving is more motivational but also that it brings improved attitudes and the command of more basic skills."¹³ However, Hilgard adds a warning against unquestioning acceptance of psychological findings at present, when he says that psychologists must turn more purposefully to studies of problem solving and creativity in order to replace present emphasis on studies of rote learning.¹⁴

One study by Katona compares two groups that used different approaches to problems. The first group used memory; the second group worked on solving similar problems after they had received explanations. Both groups then had retests; the second showed real superiority.¹⁵

Further evidence that the problems approach is superior to the subject approach was found in an experiment with 1,415 children in the Los Angeles public schools. The children were taught sixteen units, some by the problem-centered method and some by the subject-centered method. Among the findings of the study, the following seem applicable here: The extent to which pupils learned rules of action significantly favored the problem-centered approach. Learning of the factual information type statistically favored the problem approach. The extent to which pupils connected specific rules of action with specific facts revealed that those pupils who received the problem type of presentation connected significantly more specific rules of

¹² John S. Brubacher, *Modern Philosophies of Education*, McGraw-Hill Book Company, Inc., New York, 1950, p. 334.

¹³ George L. Fersh (ed.), *The Problems Approach and the Social Studies*, National Council for the Social Studies, Washington, April, 1955, p. 107.

¹⁴ Hilgard, *op. cit.*, p. 488.

¹⁵ George Katona, *Organizing and Memorizing*, Columbia University Press, New York, 1940, pp. 82-85.

action with their corresponding facts than did those pupils who received the subject presentation.¹⁶

Step One (Anxiety)

It is the teacher's responsibility to lead the class into a problem situation. Preplanning by the teacher involves thinking through the task or lesson and noting down on paper issues and problems which will show various students their needs and will offer them a challenge to pursue an aspect of the topic in detail. The teacher suggests, raises issues, and points out problems that adolescents need to solve, but he works with the class to decide what will actually be undertaken. Thus we note in the geography class that the problems finally utilized for solving, though similar, were not the original ones proposed by the teacher. The teacher's presentation of problems in tune with adolescent desires and needs, or his gathering of material, or his presentation of audio-visual aids, is for the purpose of kindling the first sparks of anxiety (step 1). The actual defining of the problem (step 2) is a mutual project.

The definition of the first step as a form of anxiety follows from statements by Bugelski. He says that as far as learning-psychologists have been able to proceed in the difficult area, it is pretty generally presumed that attention results when individuals are made anxious. How this comes about is not explained by current prominent theories of learning, but no other proposition has been advanced for an explanation of the drive behind ordinary human learning. Curiosity itself is founded upon anxiety. The task of the teacher is to create the necessary degree of anxiety.¹⁷ Such anxiety must be distinguished from neurotic anxiety, which leads to a sense of frustration in place of a desire to solve problems. Bordin says that there is an "optimal level of anxiety for each person. When the level of anxiety exceeds that point, a person is so overwhelmed by his anxiety that all of his energies are consumed in self-preservative efforts."¹⁸ Although his discussion refers to counseling, it seems to apply equally well to teaching.

¹⁶ Stanford S. Kight and John M. Mickelson, "Problem vs. Subject," *The Clearing House*, vol. 24, pp. 3-7, September, 1949.

¹⁷ B. R. Bugelski, *The Psychology of Learning*, Henry Holt and Company, Inc., New York, 1956, p. 461.

¹⁸ Edward S. Bordin, *Psychological Counseling*, Appleton-Century-Crofts, Inc., New York, 1955, p. 146.

Although in the past psychologists defined the drive to learn in terms of a disturbance or tension, the present trend, according to Hilgard, is toward a recognition of "more positive incentives, such as exploration and curiosity, or the arousal of positive (pleasurable) effect."¹⁹ The word "anxiety," then, because it may be broadly defined to include these more positive feelings, seems more definitive for this drive than the terms "interest" or "felt need," though they will be used at times in this book.

There are many possible ways to create anxiety or, in other terms, to make the student aware of its presence. The teacher might excite his class through his own enthusiasm for some one or two aspects of the lesson. His criticisms of certain written material might well set the stage for research on the part of one or all in the class. In a science class, for example, the teacher might suggest that advertisements which claim to be scientific may be suspect. On one occasion such a suggestion led the class to decide to perform a like experiment themselves. The class carried out the experiment of a detergent-burn test described in an advertisement for VEL washing powder. The test, as reported in the advertisement, proved impertinent to the fact of whether this detergent burns the skin.²⁰ Then a new problem was created in the consideration of how to carry out an accurate test.

Questions for discussion appended to the chapters in textbooks offer leads to the teacher into real-life-problem situations. Also current issues in the world or community may stimulate class research. In a history class in junior high school, the study of the Revolutionary War came alive to the youngsters when the teacher said, "Do you know what happened right here in our town during that war? The place that Harper's Drugstore occupies now was very important then. Have you any idea what happened?"

Individual Anxieties. Many studies lend themselves to individual problem solving. If a student discovers a problem during a class, the teacher should help him to define it. Whenever it is not the kind of problem which would interest many class members but is within the scope of the topic, the student alone, or with a small group, should be encouraged to seek its solution. When a class member raises an issue, and the rest of the class finds it important, time should be given to dis-

¹⁹ Hilgard, *op. cit.*, p. 468.

²⁰ Hayne Kruglak, "A Science Class Investigates an Advertisement," *Journal of Chemical Education*, vol. 30, pp. 641-644, December, 1953.

covering a solution, again provided the problem is within the scope of the topic under consideration. The teacher must be sensitive to students' feelings and concerns. Many beginning teachers allow opportunities to pass them by instead of accepting as a living challenge each problem which is important to their students.

Johnny says, "*I wonder why Galileo dropped the things from the tower of Pisa.*"

Marty says, "Would this experiment work *if* I substituted a different acid."

Janice says, "*Why* does this book say steam is colorless?"

Betsy says, "In developing plot, *how* does an author reveal character?"

Ray says, "*Suppose* the ice in the Antarctic melted, *what* would happen?"

Tony says, "*Can* you remove a double parenthesis in this algebra problem, starting from the outside as well as the inside?"

Sally says, "I should like to know *who* really wrote the book of John in the Bible."

These are examples of individual problems, with key words italicized. Sometimes the teacher helps the student to define the problems more clearly, and then assists the class to decide whether all or some of them also need answers to the problems.

It must be remembered that any theory of learning is dependent upon the individual. Where the student feels anxiety, needs an answer, and will work to find it, the teacher should be willing to allow him to pursue individual problem solving.

Class Anxieties. One morning, in a class in problems of democracy in a tenth-grade general division, the teacher began by saying, "I wonder if the topic of draft of young men is important to you. I suspect that since half of you are girls, we might omit it. The draft may seem far away to some of you fellows, and maybe you figure you'll meet that problem when it comes. Of course the draft may interfere with your job, or, on the contrary, you may be able to get the exact training you want in the service. What do you think?" Most of the class members felt interest, and some said they wanted to know more; they emphasized the fact that girls feel strongly about the draft because their boy friends leave them behind. Since the teacher was alert to adolescent concerns and to the fact that anxieties had been aroused, he realized that in this case most of the class needed answers.

He said, "All right, let's look into the matter further. What are the problems you young people are faced with because of the drafting of young men?" The class suggested seven or eight problems. These were written on the blackboard, while one of the students listed them on paper as a record for future reference. Questions were raised like, "Should you go for training before you go to college?" "What about R.O.T.C. programs?" and "Should you expect a girl to wait for two years?"

Then the teacher asked, "What is the problem here? Are we seeking some kind of solution?"

The students then defined the problem and agreed that the boys, at least, must have a solution; the girls might need to decide the question so that they might help their boy friends. The problem they phrased thus: "Should a boy in high school find ways to postpone his military service, or should he enter immediately after high school?"

After the problem was named and the concerns listed, the teacher pointed out difficulties in finding answers and asked for possible solutions. Finally ways and means were outlined, and most students were helped to think about finding one or two answers or theories. Two days were utilized in thinking through a problem of much value to teen-agers. Where small subproblems arose, the teacher helped the group to decide whether they were important to a sufficient number of students to warrant consideration. The result was not, of course, one specific answer. It was the teacher's feeling, however, that the young people had become less emotional and more critical toward this rather controversial subject, that they had formed some judgments or had at least examined possible hypotheses and would explore these further. Haphazard solutions or thoughtless trial-and-error methods had given way to carefully evaluated conclusions. The learning involved information, and it aided the students to develop hypotheses and judgments based on a critical analysis of available materials and sources. Though many individual subproblems were included, a class anxiety had led to the solving of a class problem.

Steps Two to Five (Definition to Appraisal)

At step 2 mutually agreeable problems or a number of individual problems must be defined. The class in problems of democracy defined one class problem. Their definition was not the teacher's, but

arose from their anxieties after the teacher had stirred up many areas of interest. Because they wanted to know the answer to the problem, they were able to move forward to steps 3, 4, and 5. If the teacher had announced, "Today we shall study the problem, 'Should there be universal military training?'" the response of the class members would have been cool and uninterested. In general, if the teacher has aroused interest, the students need then to be urged to discuss among themselves possible problems and to agree upon one or several which they will pursue. Once they have thus defined a problem which they care about, the other three steps of problem solving should follow, depending upon general ability and level of aspiration. "The level of aspiration is defined as the degree of difficulty of the goal toward which a person is striving" influenced by the individual's concept of his ability and by some group standards.²¹ Past failures and successes,²² as well as the student's present achievement level,²³ and his acceptance of certain group standards, all are a part of the level of aspiration, which will partly determine whether or not the student will follow through to solve his defined problem.

This actual defining of a problem in class, either by an individual or by the group, does not rule out the many areas of interest which a student may discover during the steps of problem solving. On some of these he will take action, that is, define his problem, and calling on what he has already learned, decide upon a hypothesis and/or judgment.

Teacher and students aid one another in definition of problems. Brubacher points out that philosophers are more prone than ever to agree that the teacher should consult children on the question of what to include in the curriculum.²⁴ Such a conclusion concurs with Dewey's strong emphasis upon learning which depends upon real interaction, upon Hilgard's statement that psychologists generally agree that active

²¹ Kurt Lewin, *Field Theory in Social Science*, Harper & Brothers, New York, 1951, pp. 81-82.

²² Jerome D. Frank, "Individual Differences in Certain Aspects of the Level of Aspiration," *American Journal of Psychology*, vol. 47, pp. 119-128, January, 1935.

²³ Paul S. Sears, "Levels of Aspiration in Academically Successful and Unsuccessful Children," *Journal of Abnormal and Social Psychology*, vol. 35, pp. 498-536, October, 1940.

²⁴ Brubacher, *op. cit.*, p. 331.

participation by the learner is preferable to passive reception,²⁵ and upon our general acceptance of democracy.

Assuming that with the teacher's alert direction and suggestions a problem has been located and appraised, we may expect that a class will propose several ways of solving the perplexity. If it is a little problem, the solving may come about quickly in the form of a brief discussion which the teacher summarizes by presenting the several hypotheses or judgments offered by the students. On such occasions, which occur frequently in most classes, the students are usually unaware that they are following problem solving. In a more complex problem, as in an English class where the students are trying to discover how to interpret a poem, several suggestions might be offered, such as, "Suppose each one reads it and gives an interpretation," "What about the teacher giving the right interpretation?" and "Maybe we could look up other material and see whether the author interpreted the poem, or whether some important writer did so."

And then would come the rebuttals. To suggestion 1, "Then we should have thirty interpretations. That wouldn't get us anywhere."

"Maybe we could see how many of us agree on our interpretation."

"Is there one interpretation of the whole poem or one for every line?"

To suggestion 2, "There isn't any right interpretation. The teacher could give his own, though."

To suggestion 3, "Where could we ever find out?"

Then, as the students pursue the possibilities—their interest further aroused at each new suggestion—the teacher helps them to narrow down the possible steps.

At step 3 the teacher aids the students to find and consider whatever information and attitudes they need in order to acquire the background necessary to solve their problems. Research and experimentation with materials, in books, in the environment, are undertaken at step 3 by all students, either on different aspects of one large problem, as in the problems-of-democracy class, or on a number of subproblems of one over-all topic. If the topic being studied in English were newspaper writing, some students might discuss editorials, some features, some news items; some might consider whether or not straight facts are presented in a newspaper.

²⁵ Hilgard, *op. cit.*, p. 486.

In this phase of problem solving, the teacher will suggest further reading or offer information; the students may propose means of testing the suggestions; the textbook may have references. Students should become aware that they must find basic information and must understand the attitudes of others in order to reach hypotheses and judgment. However, if the problem is small and the students have enough background, step 3 may involve only a brief discussion among class members as a basis for tentative conclusions. Or audio-visual materials, a lecture, a demonstration may provide the information or attitudes necessary for forming conclusions.

In the search for an interpretation of a poem, the English class agreed to take several famous poems and to attempt to discover something about their interpretations. In order to introduce the search, the class read Edgar Allan Poe's "The Raven." Then, one group agreed to consider the poem and offer their own interpretation. Another group, for their study, found several books containing criticisms of the poem. A third group perused Poe's "The Poetic Principle" to discover his ideas about poetry as they might apply to "The Raven." The fourth group studied "The Philosophy of Composition," by Poe in which he explains his thoughts and intentions in writing "The Raven." By pooling their findings, the students discovered that ideas vary widely as to a poem's meaning and purpose, as well as the thought it successfully conveys to the reader—in fact that ideas vary even to the point that some critics doubt Poe's own interpretation of his intentions.

At step 4 the teacher asks that the students indicate in written form or orally their hypotheses about the small subproblems and finally about the over-all problem—if they have found one. In discussing the question of the draft, for example, some students said (all aspects having been considered as a result of step 3) that the draft is vital to national defense, some, that the draft should be replaced by some other requirement. Moving on to step 5, the students considered how their hypotheses might lead to further learning and studying. At this point in any discussion the teacher asks the students what they now need to know as a result of forming hypotheses about a problem. In the problems-of-democracy class, students made such comments as, "I need to know R.O.T.C. requirements"; "I want to know just what training programs the Navy offers." Here, then, are new areas of need. Problem solving perpetuates itself, always raising new anxieties and new

problems. As Montaigne says, "It is but personal weakness which forces us to content ourselves with what others or we ourselves have found out in the hunt for knowledge."

Judgment

At this time the students should be encouraged to formulate personal judgments whenever they feel ready to do so. In the draft discussion some judged, then, that they would go into a vital industry and hope to postpone or avert military service. Others concluded that they would enter the service immediately and choose the branch they liked, hoping, for example, to receive training in electronics; still others decided to join R.O.T.C. units. And some could not decide. The girls' tentative decisions for their boy friends followed the same various possibilities.

Although it is vital that students form personal value judgments when they are ready to do so, the teacher needs to be on the alert for instances of mere adoption of the value judgments of others. If a student can be aided to form personal judgments which he truly accepts and upon which he will and can act, then he will be free from neurotic tendencies in these areas. Rogers shows the prominent place of values adopted (but not really accepted) from others in the experience of disturbed clients.²⁶

The idea that students ought to be led to formulate judgments seems unacceptable to some teachers, particularly if they have been grounded completely in the scientific, inductive approach to reasoning, distrusting a further step of deduction into a value judgment. Yet philosophers have been concerned with such judgments for thousands of years, and they agree that since each person does make value judgments, the question is only how well he makes them. Hocking says, "Every individual has to work out his own standards."²⁷ Since the judging is inevitable, the teacher turns to a consideration of the worth of the student's judgment for himself, that is, to aiding the student to formulate an examined, critical judgment.

²⁶ Carl R. Rogers, *Client-centered Therapy*, Houghton Mifflin Company, Boston, 1951, p. 149.

²⁷ William S. Hocking, "What is Man?" *Preface to Philosophy*, The Macmillan Company, New York, 1947, p. 41.

Beck says, "It would be unjustified to insist that there is any one value judgment that can be validated."²⁵ But he agrees with other philosophers that the facts of the matter must be investigated as far as possible through reasoning (or problem solving). With the background of careful problem solving, the teacher should feel that the student who is ready to make a choice has taken the steps necessary to making a desirable judgment, which, as Dewey says, is not just something he desires, but is based upon criteria and norms²⁶ developed during problem solving. As Socrates indicated, only that conduct is good which is chosen because one sees it as good.

"What is the best way to write a theme?" might be a class problem. Research would lead to hypotheses including such items as: A good theme ends where it began; all its parts should be logically connected; its paragraphs contain a topic sentence. When the student says, "I believe—I will—I ought" in relation to this problem, he changes from a problem solver or scientist to a judge. "I *ought* to and I *will* try to write my themes with these points covered because I *believe* they will help, but I also *believe* they alone cannot make a good theme." Here the teacher helps the student to take the final step into judgment and to verbalize it, not because the student would not form a judgment otherwise, but because he would form an unexpressed one, perhaps not built on the problem-solving foundation which he has laid. Such judgments might be, "I don't like to write themes and I *will* not try," or "I *believe* this is a lot of nonsense." Therefore, finding ways to aid students to express in verbal or written form their real judgments is a necessary part of critical thinking.

It is important that the teacher develop critical thinking by asking, "What good will these ideas do you? How will you know whether your decision is right?" Here he helps the students to evaluate the process of problem solving and their ways of arriving at a judgment.

Finally, whether the problem is brief or extensive, the teacher or a student needs to combine step 5 with critical judgment by offering a carefully prepared summary which will incorporate the points made by the class members. "I have noted all the ideas presented during the

²⁵ Lewis W. Beck, *Philosophic Inquiry*, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1952, p. 223.

²⁶ John Dewey, *The Quest for Certainty*, Minton Balch, New York, 1929, p. 260.

solving of this problem. These are the ideas some of you have offered." After he lists them, he may wish to offer his own. "These are the final judgments I believe and accept; these are some ideas I wonder about."

As a teacher becomes adept, he will retain in his mind the many ideas suggested. If the solving is of a small problem, his summary will be swift and easy, but if the problem is complicated, he will need some means of recalling each idea. The best plan is to request that a class member record all suggestions; then the review will incorporate every idea presented.

Some problems may not seem conducive to judgments, and the teacher should not try to build judgments where they do not arise naturally. However, contrary to what might be expected, most real problems that students suggest presuppose critical judgments, because when the student defines a problem which he personally cares about, this involvement of himself leads him to desire a personalized kind of solution. If the teacher wishes his students to solve mathematics problems from the book, he should not expect judgments. But if they solve a problem in mathematics which they themselves define, it will usually be the kind of problem which warrants personal, critical judgments. In a class which was studying the right triangle, the teacher aroused anxiety by discussing building, engineering, farming, and other uses of the right triangle, finally asking the class what they needed to know in order to understand the right triangle. A student declared, "I don't see that the right *triangle* is important, only the *angle* as in making a squared wall. I think the problem is whether the triangle has anything to do with this kind of squaring, and if so, what." The class adopted a variation of this problem, formed hypotheses and appraisals, and finally arrived at such judgments as: "A carpenter ought to use the right triangle in all squared places in order to build a good house. I would take great care to be sure of this in any building which I might design or construct because a leaning wall would be neither pretty nor safe. Everyone who wants to do any designing, even laying out a garden, needs to understand the right triangle thoroughly."

It is important to remember, at the final step of problem solving and the forming of judgments, that most psychologists agree that the learner makes better transfer of learning to new tasks if he has experience during learning of applying principles in a variety of tasks.³⁰

³⁰ Hilgard, *op. cit.*, p. 487.

As the student pursues step 5 he is, by definition, discovering the relationships. Where he forms hypotheses and judgments and they may be applied in other areas, transfer to similar situations will more probably result.

As we have said, many psychologists feel that drill and practice (a form of conditioning) are at times important. Thus the student who wants to apply the rule, "You double a consonant when adding an ending to a word if the last consonant is preceded by a single vowel, and if the word is accented on the last syllable," or, "A square contains four equal angles," would simply cite different examples. Since we are concerned here with critical thinking, we shall leave a decision about this matter entirely to the teacher's discretion.

Wherever possible, hypotheses and judgments should be examined, tested, and reapplied in various settings, to make for best transfer. If a student hypothesizes, "Communism means subjection of the people," when he studies a unit on Fascism, he should be urged, by comparing Communism and Fascism, to reexamine his hypothesis in the light of his new findings. A judgment such as, "I would fight Communism" should also be reexamined in the study of Fascism and later in a study of democracy. In this way the student will gain the experience of applying findings in a variety of situations.

Class-defined Problems and Conclusions

Young people must recognize problems and work to solve those that are most important to them. The teacher plays the role of guide; though he suggests and introduces problems, he allows the students to experiment on isolating problems and on judging those most relevant to the class. Of course it is easier for the teacher to do the judging, and it takes a skillful teacher to exert the necessary direction without becoming the dictator and decision maker. He must keep in mind that reasoning and judgment constitute his aim for his students, and that if he fails to allow the necessary freedom to them, he defeats his own purpose. If allowed freedom, the students will flounder, but they will flounder toward a goal.

The kinds of problems that might evolve in the process of class work are endless. In English, "Why do we learn to write themes?" or, "How do we interpret a poem? Whose interpretation is right?" In

language, "How do we learn to speak fluently a foreign language?" or, "Why should we study grammar?" In biology, "How can we interpret or understand the various research reports about a certain disease?" In social studies, "How do we learn the right way to vote?" or, "Why should we learn about life in early Rome?" In chemistry, "Why do we find out whether a certain solution is an acid?" or, "How can we tell the chemical make-up of a commercial product?" In mathematics, "How can we discover the uses of mathematics in building a bridge?" In art, "How can we like and appreciate modern art?" In home economics, "Is it better to use ready-mixes or to make your own cake? How can we judge?" In physical education, "How important is exercise to us at our age?" or, "How far up in the air do we throw the ball in a tennis serve?" In shorthand, "How fast does an average boss dictate?" or, "What can you do to figure out a word when you can't transcribe it?" In mechanical drawing, "How many things does a perspective drawing tell you?" or, "How can you keep drafting paper from smudging?" In speech, "How can we deliver speeches when we're frightened?" or, "Why should we learn to enunciate?"

Besides, there are all the little problems and issues, such as: "Are we like the Romans?" "Could we vote correctly at eighteen?" "Can 'Birches,' by Robert Frost, ever give as good a picture of nature as a painting?" "Would we be as well off without electricity?" "Victoria wasn't Victorian, was she?" "Is mathematics beautiful, as Edna St. Vincent Millay suggests?"

It is not our intention here to pursue the controversy about choice of content or of curriculum by students. We have maintained that course content must be decided by each teacher. If the administration permits, and if the teacher deems it advisable, he may wish to allow the students to choose subject matter as well as to discover means to study the material. In most of our examples we have assumed that units, at least, are already determined. The students then attempt to define and to solve problems within the adopted area.

The final outcome of class problem solving is not class agreement. One of the most common mistakes in pursuing this way of teaching is to believe that class agreement or a majority vote is necessary. Each student is unique, and although adolescents have much in common they are different from one another. The purpose is to promote reasoning, but hypotheses and judgment may often be different for each stu-

dent. If some students decide that there is a right interpretation of a poem, perhaps the author's own or a consensus of the opinions of literary critics, and others feel that everyone's opinion constitutes acceptable interpretation, still the problem solving has been successful for those students who take part, because they have thought and judged. We do not imply, in allowing the student to exercise his own judgment, that every answer is equally right. What is true is not affected. But the fact remains that rarely can teachers claim to know the truth for everyone, that even when they can they are not likely to convince the students of their interpretation, and that their aim is to help students to think critically and thus to seek the truth to the best of their ability.

The judgment will never be final. Testing through experience and further learning is necessary wherever possible. Students must be led to understand that their judgments are in the end tentative. This aspect of the matter can be stressed in the final discussion. Problem solving is a means of aiding students to find the thrill in thinking and learning and of leading them to develop their own need to learn more and more so that they become individuals who love learning.

It is perhaps too obvious to state that many problems have no real solution. For this very reason students drew many different conclusions about the draft question and about the interpretation of a poem. The hypotheses and judgments which will occur are not predecided but actually evolve with the steps of problem solving, the student being thus forced to create the experience.³¹

One further area of caution for the teacher must be pointed out. In making judgments the student should be led to distinguish between saying, "This is what *I* ought to do," and, "This is what *everyone* ought to do." The teacher should be well aware of the distinction he himself makes between these two judgments so that he may know how to lead students to see the necessary differentiation.

Limitations in Problem Solving

One of the most important questions about problem solving concerns whether or not the individual who has enough anxiety to carry him at

³¹ John Dewey, *Experience and Education*, The Macmillan Company, New York, 1956, pp. 41-42.

least to the definition of problems, plus ability to find solutions, will then follow through to hypotheses and judgments. There is no easy answer to this question. Hilgard warns, "The understanding which the learner wishes in a problematic situation is knowledge of the essentials to economical goal-achievement, and nothing more can be counted on."³² The teacher, then, must be aware that only this much can be assured and must watch for opportunities to help the student to look further and to delve more deeply. It would appear that greater emphasis on the sheer process of problem solving, with some deemphasis on the final result, might aid the teacher to encourage initiative.

A second problem concerns the relation of maturity to problem solving. It is perhaps too obvious to state that a mature person, rich in experience, will succeed better in problem solving than one who is not mature. But no evidence exists of the exact level of maturity which should be set for the solution of a given problem. Furthermore, the relationship between amounts of information and ability to solve problems, somewhat contrary to expectations, cannot be established. Such relationships, at best, seem quite moderate.³³ The teacher cannot be assured that the student who holds the greatest storehouse of facts and information will necessarily do a great deal better in solving problems than others who know less.

Two studies which set further limitations on problem solving may be mentioned here. Results of a study with the Katona Match Test showed that information used in guidance of students must be appropriate to the task, that some appropriate guidance is helpful for speeding up solutions, that the effectiveness of guidance does not depend only on the amount of information imparted, that though explicit instructions are most helpful with more able students, less explicit instruction is just as effective for the less able.³⁴

Another study in mechanized behavior in problem solving presents certain arguments in favor of such mechanization; namely, the indi-

³² Hilgard, *op. cit.*, p. 475.

³³ Robert L. Thorndyke, "How Children Learn the Principles and Techniques of Problem Solving," *Learning and Instruction*, in Nelson B. Henry (ed.), *Forty-ninth Yearbook of the National Society for the Study of Education*, University of Chicago Press, Chicago, 1950, part I, pp. 192-216.

³⁴ Bernard R. Corman, "The Effect of Varying Amounts and Kinds of Information as Guidance in Problem Solving," *Psychological Monographs*, vol. 71, no. 2, pp. 1-21, 1957.

vidual need not rediscover a new response to a recurring situation, and mechanized behavior equips him with precise and speedy responses to certain aspects of environment and frees his mind to deal more adequately with complicated tasks. The dangers are that the individual may not solve the problem but may see it from habit, thereby applying habituated behavior, even though a better solution may be possible.³⁵

Although these studies are very limited, they show the kind of evidence which is needed in order to set adequately the limits of problem solving. Following such study, the teacher should note the possibility that problem solving may become a mechanical process, performed without thinking, unless he is alert to watch for such behavior.

Several studies have further shown that students need special help in learning how to solve problems, and that they may not use available help unless it is pointed out to them. Here is another danger of which the teacher must be aware. Maier compared two groups, one of whom had heard a lecture with suggestions on how to solve problems and on what to expect in doing so. Of the 178 persons in the first group, 68 per cent were able to solve one of the problems while only 48 per cent of the second group of 206 were able to do so.³⁶ In a study of student approaches to problems, Wiles concluded that although one-third of the group had gone through the entire school, associating with about fifty teachers, no one had corrected their glaring deficiencies in purposeful, fact-collecting skills.³⁷ Jones asked students to find the square roots of six-digit numbers. The students tried to use forgotten forms in place of logical thinking or even trial and error.³⁸

* * *

Problems as they occur in the classroom may be large, covering a whole unit, or small, requiring two minutes for their solution. Regardless of their scope, the steps described are the same. With large problems these steps are followed slowly and carefully; but within the large problems, when incidental questions arise, they may be defined, con-

³⁵ Abraham S. Luchins, "Mechanization in Problem Solving," *Psychological Monographs*, vol. 54, no. 6, pp. 1-93, 1942.

³⁶ N. R. F. Maier, "An Aspect of Human Reasoning," *British Journal of Psychology*, vol. 24, pp. 144-155, October, 1933.

³⁷ Kimball Wiles, "Are We Developing Skill in Purposeful Fact Collecting?" *Journal of Educational Research*, vol. 38, pp. 617-623, April, 1945.

³⁸ Glenn Myers Blair and others, *Educational Psychology*, The Macmillan Company, New York, 1954, p. 226.

sidered, and summarized in a moment or two. Not every problem will be solved. When students reach no solution they should be helped individually to form tentative hypotheses. Consensus is not to be expected.

Likewise, we do not expect agreement from the reader. We hope only that we have stirred up areas of anxiety, causing him to define a problem; that we have then suggested possible solutions which he has been led to accept or reject, to rethink, or to supplement with his own; finally, that we have impelled him to form tentative hypotheses and judgments.

LEARNING MATERIALS

Some Cases

1. The teacher said, "I followed all the steps of problem solving and now I have twenty-nine students with twenty-nine different ideas about the geography of Hawaii. How can I teach this way when I can't depend on what they will come up with?" What attitudes about the outcomes of problem solving does this teacher need?

2. The teacher said, "Today we shall use problem solving. Our problem is, 'How can we take care of our eyes and our sight?' All read pages 21 to 26 to find the solution to our problem." How might this teacher be shown the real meaning of problem solving?

3. The class defined a problem at step 2, and the teacher said, "Now we must decide how we shall go about solving this problem. Where shall we find answers? What kinds of sources do you need which I can lead you to?" Why did he not just tell the pupils where to find the answers, or else have them read their texts to find the answers?

4. The teacher summarized the learnings of the class at steps 4 and 5 thus: "We have agreed that Francis Bacon was a great man. We said that some of his essays, like 'Of Studies,' have never been equaled. Besides, his help in the field of science makes him really well-rounded."

Jesse thought, "He was dry."

Alice thought, "He wasn't as great as lots of other men who are more interesting."

What must this teacher come to know about the outcomes of problem solving?

5. The first teacher said, "Here is a picture of Chartres Cathedral. We'll study this next."

The second teacher said, "In 1194 the people of Chartres were weeping over the smoking ruins of their church. But some men spoke out to say that they would build a new church, this time of stone, around the beautiful window they had saved from the fire. So they began to build, by hand, with mallet and chisel, a great cathedral."

The third teacher used both approaches. What else could be done to arouse a recognition of anxiety for answers in the students?

Some Controversial Thoughts

1. "The greater a person's power of thought, the greater will be his happiness."³⁹

2. Researchers agree that "the most significant step in gathering knowledge is to ask the proper questions, to state the problems for which answers are sought, to understand what one is about."⁴⁰

3. "Our associational processes in reasoning are directed by the nature of the problem, as we conceive it. The problem gives us a set . . . which facilitates recall of certain items and inhibits recall of others not relevant."⁴¹

4. Find the problem situations that are real to children and let them work out solutions. Then "the time will come . . . when many of our most perplexing social problems will become real to them."⁴²

5. "Learning a football play, a musical score, or a dance step is a problem-solving process, just as is thinking through the reasons for selecting a particular high school course."⁴³

Suggestions for Further Reading

1. Bloom, Benjamin S., and Lois J. Broder: *Problem-solving Processes of College Students: An Exploratory Investigation*, University of Chicago Press, Chicago, 1950. Includes obstacles to applying problem solving as shown experimentally.

2. Duncker, Karl: "On Problem-solving," *Psychological Monographs*, vol. 58, The American Psychological Association, Inc., Washington, 1945. For students of psychology, a study of practical and mathematical problems.

3. Herbart, Johann R.: *Outlines of Educational Doctrine*, The Macmillan Company, New York, 1901.

4. Schorling, Raleigh, and Howard T. Batchelder: *Student Teaching in Secondary Schools*, McGraw-Hill Book Company, Inc., New York, 1956. Chapter 7, "The Broader Concept of Method."

5. Wertheimer, Max: *Productive Thinking*, Harper & Brothers, New York, 1945. A further discussion of problem solving.

³⁹ Aristotle, *Nicomachean Ethics* X (viii), based on the translation of James E. C. Welldon.

⁴⁰ Nathaniel Cantor, *The Teaching-Learning Process*, The Dryden Press, Inc., New York, 1953, p. 45. Reprinted by permission of The Dryden Press, Inc.

⁴¹ Norman L. Munn, *Psychology: The Fundamentals of Human Adjustment*, Houghton Mifflin Company, Boston, 1956, p. 307.

⁴² H. A. Overstreet, *The Mature Mind*, W. W. Norton & Company, Inc., New York, 1949, p. 252.

⁴³ William M. Alexander and Paul M. Halverson, *Effective Teaching in Secondary Schools*, Rinehart & Company, Inc., New York, 1957, p. 41.

PART TWO



3

Adolescents and Adolescence

If students arrived in the classrooms with their minds receptive and well isolated from their emotions and desires, they might respond to the teacher in an ideal manner. They could feel immediately a need for the subject matter and, with no interference, proceed to think about it and to learn. Actually, such students would make teaching very dull, and we should probably soon wish to recapture our own real human students.

In order to help the teacher understand the adolescents with whom he must work, we shall attempt to draw a picture of these boys and girls. We shall try to point out what they are thinking and feeling and worrying about, so that the teacher will not assume that every one of his students is presenting a *tabula rasa*, ready for impression.

Needs of Every Adolescent

All individuals feel they have certain needs. Although these have been interpreted in several ways by psychologists and sociologists, some of whom now use other terminology, several common basic needs can be isolated. In addition to physical comfort and safety, every human being needs to be loved, to feel secure, to belong, to feel success, to love, to have varied experiences, and to have an integrated self. These desires are more vital than any others. From lack of them grow the insecurities and unhappinesses of life; from their satisfaction comes the happiness of young people, teachers, and all other human beings.

To Be Loved. What does it mean when a teacher declares, "Johnny Adams comes from a bad home without any love; no wonder his behavior is so peculiar"? Does the statement imply that the teacher is ready to accept Johnny's plight? Does it mean that the teacher, who apparently understands the cause of Johnny's difficulties, feels that there is therefore no hope for the boy? In spite of a bad home, can Johnny find substitute love elsewhere?

If all human beings, adolescents no less than others, need to be loved, the teacher ought to offer some of this love. Offering love to students has been viewed with misgiving, with fear that students will take advantage of those who love them, and will perhaps assert their own importance. Yet probably every teacher would say that he believes in the power for good of love for others. If the word seems out of place, we might substitute "caring for." No matter what we call the feeling, adolescents need its benison from their teachers. Whether or not they are loved at home, they will blossom under the sense of being loved in the classroom.

Although some writers, like Fromm, have attempted to define love, it seems better to leave the word at the commonly accepted cultural definition. Acceptance of others is a part of love. "I accept you as you are, understanding that your behavior has a reason." The need for love may be met in the classroom by love from the teacher without any implication that he thereby becomes too friendly with his students. He retains his position, no more attempting to become "one of the boys" than a mother attempts to become a three-year-old in order to love her child.

To Feel Secure. We know a teacher, Mrs. E, who says in an aside to other teachers, "I like to get them in their seats and tell them I'm going to call on each one to recite an answer. I tell them if they don't know it, that means another zero—and zeros don't add up to much." Her hearers envision the sophomores in high school squirming in their seats, the shy ones blushing with fear of being called on, the unsure ones accepting the fact that they will be too confused to answer even if they have studied, the brilliant extroverts smiling with confidence, and most of the rest uneasy and unhappy.

Again we assert that a feeling of security is extremely important. If they fail to find security, many students travel the road to failure, personality problems, worry, and perhaps real maladjustment. Every teacher, therefore, must feel an obligation to aid each and every student to feel secure, to feel that whatever a young person can and will do academically is acceptable, even though the teacher hopes he will take steps toward achievement at a higher level. Only through reiteration of this idea in all classroom situations and within course content can the teacher hope to help the students in his class to feel secure.

To Belong. Sometimes a youngster in a class is an outcast from the group. He may have a handicap, such as stammering; he may be extremely shy; he may be new in the community; he may have less money than the others or perhaps dress in a different manner. Of course the teacher cannot force the group to accept the outsider, but he needs to show by example that this young person belongs in the class, and that he is accepted for himself.

If the feeling of belonging is essential to each person, then the teacher has a responsibility to recognize its importance and to foster it. Ways and means will vary, but a sensitive teacher will be aware of every opportunity to promote an adolescent's feeling of belonging to a class or to a group. And in the material to be studied, wherever applicable, he will show how the need to belong may be met.

To Feel Success. Recently we talked with a girl in junior high. She confided that she hates school. "I'll tell you why. All the time, Robbie Roberts and I fight for the last seat in the class. They seat you by how smart you are, and we two are the dumbest. I hate school. I'll be glad when I don't have to go to school any more." Obviously, the youngster who has no feeling of success will not be very favorably disposed toward school.

At present this country is in the throes of a "revert to higher standards" revolt. We are told that by educating all youth we have lowered our standards to the nadir. Yet it has been in an effort to help youngsters, each at his own level, to feel success that this "lowering of standards" has come about. We do not wish to pursue pro or con the argument, but if we are to keep young people in the schools, somehow, because they are human beings with the desire for success, we must provide them with the satisfaction of their desire. If a teacher uses different standards for different students and makes each one feel successful according to his ability or abilities, then he is performing his job in helping the youngsters in his care. Furthermore, the material to be studied may often present ideas about success, and the teacher, knowing that adolescents may find such ideas stimulating, may watch for opportunities to point them out.

To Love. Adolescent life, like adult life, is not complete when merely receiving. Each person needs to love and to give of himself as he blossoms under another person's loving interest. The teacher needs to be aware of situations and occasions when he may help his students to express love and to give of themselves to others. Caring for others selflessly is one of the basic arts of living.

If Sue offers to help Edie, who is having trouble with her algebra, this generosity needs to be encouraged, not frowned upon. If Sally, who always wants to be leader, is subtly helped to understand why Marty or Dan ought to have his turn, why he needs the experience of leadership, perhaps she will begin to think in terms of caring for others. A talented teacher will be aware of unlimited opportunities.

It is important, too, that one learn to love oneself. Self-respect and self-acceptance are vital to happy living, and therefore the need to love includes the need to esteem both others and oneself. Again, by using both the classroom situation and subject matter, the teacher helps to satisfy the need for self-esteem.

To Have Varied Experiences. Studies have shown that mentally retarded individuals, because of limited perception, are able to perform well the monotonous operations in industrial plants.¹ Normally intelligent human beings need a variety of experiences in order to develop satisfaction from life. Experts on reading at the elementary level have

¹Theodora M. Abel and Elaine F. Kinder, *The Subnormal Adolescent Girl*, Columbia University Press, New York, 1942, p. 90.

shown that the child who has known rich and varied experiences learns to read quickly. Varied experiences should help to form individuals who can face many situations and who can learn enjoyment, as the philosopher says, at one hundred different points of life. The youngster who is timid and unable to adjust to situations may very well have missed such richness in his life. He may satisfy his need for varied experiences personally in the classroom and vicariously in the material to be studied.

To Integrate the Self. Psychotherapists have been impressed increasingly with the difficulties in the life of the individual who cannot decide which values are his and which he ought to live by, for the very reason that they belong to someone else. His feelings of guilt and neurotic anxiety may make his life miserable if he fails to integrate what he is, what others want for him, and what he wants for himself. Freud wrote extensively about the id, the ego, and the superego; and this concept has been adapted to the present meaning of integration of self.

All human needs are interrelated; some are stronger in some individuals than in others; all of them are very important in the integration of the self. As a student's needs are met within the classroom situation and within the study of course content, he is aided to feel right about himself and his activities, and thus he achieves a large degree of self-integration. "*Psychological adjustment exists when the concept of the self is such that all the sensory and visceral experiences of the organism are, or may be, assimilated on a symbolic level into a consistent relationship with the concept of self.*"² In order that this may take place, a person must consciously accept his impulses and perceptions.

The teacher may feel assured that each of the needs we have discussed is present to some degree in each of his students. In addition there are special needs, common to all adolescents, which are no less important than the basic needs of which they are really outgrowths. Since they are peculiar to the adolescent years, they naturally alter and change with maturity. The variation in a given adolescent and among adolescents is tremendous; in the experience of just one youth these feelings may fluctuate a dozen times a week. Furthermore, since

² Carl R. Rogers, *Client-centered Therapy*, Houghton Mifflin Company, Boston, 1951, p. 513.

this is "a period in an individual's life of finding himself as a person, there is likely to be more or less struggle within the maturing adolescent as he attempts to determine his rights and responsibilities in his relationships with adults and with his peer group."³

To Be Like His Peers. The emphasis upon needs has begun to alter by the time adolescence is reached. Originally parents and a few other adults, perhaps siblings and relatives and a teacher or two, comprised the world of the child. As he grew his world broadened at a tremendous rate. Gradually, without realizing it, the young person began to look for satisfactions from his peers. Cartoons emphasize the adolescent feeling that parents know nothing and are not worth listening to. While this feeling is not wholeheartedly held and is partly bravado, nevertheless the adolescent knows that he absolutely must be accepted by his peers. His experience demonstrates that he is accepted when he is as much like his peers as is humanly possible. This is the age of fads. The boys must have their special haircuts; their pants must be shaped this way or that, their shirts tucked in in such a way that they look alike. The girls must wear the same kinds of sweaters and shoes and lipstick as their friends. An article in the *NEA Journal* says, "Most teenagers would rather be dead than be different." And later, "Being one of the herd seems to be the teenager's main aim in life."⁴

The teacher, as he glances out across his classroom, may be surprised to see a dozen girls with a certain kind of flower in their hair, another large group with blouses almost identical. He may note that all the boys have allowed their hair to grow in one long piece down the back, and that they all wear fancy shoes. But the likenesses go further. There will be special expressions and ways of speaking and acting which are peculiar to the whole group. As the teacher considers the matter, he realizes that attempting to break down this tremendous urge to be like the others would be useless. His students must be met at their level of interest. But he also hopes that he may help each one of these youngsters to consider the importance of being himself, of standing on his own feet, and of standing for something he believes in. Probably within course material the teacher can find and emphasize instances of strong individuality.

³ Lester D. Crow and Alice Crow, *Adolescent Development and Adjustment*, McGraw-Hill Book Company, Inc., New York, 1956, p. 5.

⁴ John J. Pasciutti, "Who Wants to Be a Sissy?" *NEA Journal*, vol. 42, p. 568, December, 1953.

Students at this age guard jealously their group ideals or mores because of their desire to be like their friends. If peer standards say, "Little studying; mediocre grades," students will follow the word as though they have been brainwashed. Persuasion toward change must evolve through the total group, and the teacher can hope to accomplish it only by helping the whole group to find that their needs are better met in new areas which they have not yet discovered. Sadler says that the social pressure of the group is increasingly great at this age,⁵ and the student who may wish he might do better work to please the teacher will be sure to follow the group because he cannot stem the social pressure. A teacher must therefore work through the whole group if he is to bring about changes; he must, in particular, get to know the group leaders and gain their confidence.

Of course an occasional adolescent will appear who pretends that the group means nothing to him. Either he withdraws altogether, or he achieves high grades in solitary splendor. If we accept the fact that the need to be like others is always present, then the teacher realizes that these isolated youngsters are fighting a battle which they feel they cannot win and that they are compensating in the only way they know. Again it is the job of the teacher, through his teaching, to attempt to help these outcasts to feel like their peers.

To Become Independent and Interdependent. An adolescent seems neither fish nor fowl. On one day he seems absurdly childish for his age, perhaps indulging in something like an infantile tantrum; on another we may wonder at his excellent judgment in making a difficult choice. These changes are swift, frequent, and unpredictable. As one writer says, "Undoubtedly the adolescent is himself often unable to understand why he looks at things one day as a juvenile, while the next he may view an entirely analogous situation much as would an independent, self-assertive adult."⁶

An adolescent's feelings vary. In one situation he views the teacher and the classroom situation in an adult manner. He considers the worth of education to himself; he resents being told how to do things or when to do them; he will argue violently that a person of his age ought to be able to make his own decisions and to pursue his own studying and learning in his own way. "Treat us like grownups. We

⁵ William S. Sadler, *Adolescence Problems*, The C. V. Mosby Company, St. Louis, 1948, p. 81.

⁶ *Ibid.*, pp. 70-71.

aren't babies now. We can do things on our own." But on the next day he may not prepare his lesson; he may be inattentive and preoccupied. He wants to be pampered and helped with small tasks and given little boosts. He remembers what it was like when his first teachers helped him, allowed him to postpone his work, and sheltered him from any real difficulties. He recalls how comforting that situation was, and he wishes he were again a child.

The teacher who attempts to follow the golden mean may run against real difficulty. He finds little middle ground in a class composed half of adults and half of children. Lewin says that the adolescent is similar to sociology's marginal man. He does not belong to either of the groups between which he stands "or at least he is not certain about his belongingness."⁷ On the other hand, adolescents need to be viewed as something more positive than "neither fish nor fowl." They must be seen as human beings undergoing a growing-up ambivalence which leads them to seek love and the sense of belonging, at one moment in an adult manner and at another in the old, familiar childish way. A talented teacher will need sometimes to coddle them, sometimes to meet them on adult terms, and he must be sensitive to their changing moods. All the time he is helping the young people to move from dependence, not to independence alone but finally to interdependence.⁸ Often content of study will offer information and attitudes which will show the adolescent how to meet his need for independence and how to look toward interdependence.

To Accept a Partly New Self. Throughout a large part of adolescence, the physical body, the emotional needs, and the cultural stresses are changing and causing a partly new self to develop. Havighurst points out the need to accept the physical body and to become man or woman, as well as to find a place for new feelings about the other sex.⁹ This need may be more insistent in the early years of adolescence, but apparently is not completely met by most individuals until after the adolescent years. At the early stage the student may be preoccupied

⁷ Kurt Lewin, *Field Theory in Social Science*, Harper & Brothers, New York, 1951, p. 143.

⁸ Robert S. Stewart and Arthur D. Workman, *Children and Other People Achieving Maturity through Learning*, The Dryden Press, Inc., New York, 1956, p. 111.

⁹ Robert J. Havighurst, *Human Development and Education*, Longmans, Green & Co., Inc., New York, 1953, pp. 111-119.

with his physical development or lack of it, with proving his new manliness or womanliness, with winning the approval of his peers of the opposite sex.

Implications for the Teacher. Because it is vital to an adolescent that his needs be met, he perceives others through the perspective of his desires. If the teacher understands how important these matters are and works to offer the student satisfaction through both the classroom atmosphere and the subject matter, the youngster (assuming that he is not so poorly adjusted in other areas of his life that he cannot realize the attention offered him) should feel at ease, happy, and relaxed; he should not worry, except occasionally, over other matters to the point of preventing learning.

The teacher who sees into his students is the talented teacher. He does not look out over a sea of faces and say to himself, "Today I'll cover Chapter 3." He looks out into the feelings and thoughts of Johnny and Mary and Sally and Sam. He knows what is on their minds, and what they want most at that moment. Somehow he shows them how his ideas and material are vital to them because they fit the picture from their own viewpoint.

Developmental Problems

In many areas of living each individual must meet what some psychologists and sociologists call developmental problems, or, following Havighurst, developmental tasks. These include such matters as learning to go to school and stay away from Mother, learning to get along with the opposite sex when dating begins, learning how to get a satisfactory job. The developmental tasks stem from the growth and development of the individual in his society—a growth which subjects him to the influence of the demands and conflicting values of that society. Sociologists point out the differences in value training at the different socioeconomic levels. This matter will be discussed in detail in the section on motivation. Havighurst says, "A developmental task is midway between an individual need and a societal demand. It par-takes of the nature of both."¹⁰ Although a person must meet his basic and particular needs, he does not have license to meet them by any and all means. Only within the structure of society and the areas

¹⁰ *Ibid.*, p. 332.

of living prescribed by society can he satisfy his desires. Moreover, the very structure of society dictates, to a certain extent, the way he may try to find satisfaction.

Roughly, the problems or developmental tasks may be divided into twelve areas. It is in these areas of life that each adolescent must find satisfaction of his needs as they are played upon by the demands of his environment, his socioeconomic group, and the individuals who make up his world. The areas concern health, sex-marriage, education, vocation-avocation, time, discipline, economic status, morality-religion, social relations, citizenship, home-family, and a unifying philosophy of life. This list of areas (together with some suggestions about the tasks peculiar to adolescence) has been adapted from studies and research by Little and Chapman,¹¹ Risk,¹² Symonds,¹³ Remmers (and his Purdue polls),¹⁴ and Havighurst.¹⁵

Since the studies vary greatly in the order of importance they assign to the areas, we have not attempted so to order them. Importance obviously varies within communities, within schools, and with individuals.

Some of the tasks which are peculiar to adolescents within these twelve areas are presented in the form of comments by the young people themselves. The happy, well-adjusted youth is the one who can face the developmental problems of life, working them through to his own satisfaction. As he attempts in these several areas of living to fulfill the needs already mentioned, he is thinking, solving problems, and forming judgment. It is this thinking which is often on his mind as he enters the classroom and finds his seat. Because the class is studying American history, the young person does not suddenly drop his American history learning cap. He may be worrying about his poor grades, or his date for Saturday night, or his quarrel with his mother, or any one of the possible problems that might arise as he attempts to

¹¹ Wilson Little and A. L. Chapman, *Developmental Guidance in Secondary School*, McGraw-Hill Book Company, Inc., New York, 1953.

¹² Thomas M. Risk, *Principles and Practices of Teaching in Secondary Schools*, American Book Company, New York, 1958.

¹³ Percival M. Symonds, "Life Problems and Interests of Adolescents," *School Review*, vol. 44, pp. 506-518, September, 1936.

¹⁴ H. H. Remmers and D. H. Radler, *The American Teenager*, The Bobbs-Merrill Company, Inc., Indianapolis, 1957.

¹⁵ Robert J. Havighurst, *Developmental Tasks and Education*, Longmans, Green & Co., Inc., New York, 1953.

meet his life's developmental problems. As Remmers says, "It is known . . . that traditionally, teenagers are concerned with themselves, their minds and bodies, their relationships with their parents, their school work, their dates, their money problems, their hopes and fears for the future."¹⁶ Superficially and for the moment the students may seem to give heed to the lesson, but the second the pressure is relaxed they revert to the matters they care about. It is the talented teacher who awakens them to the fact that the Shakespearean sonnet sings about the very matters that are important to them, and that it tells them something new about their own concerns. It is the less gifted teacher who superimposes the lesson upon the upper part of the students' conscious minds, forgetting that if they heed it for only a passing moment, they will fail to think and truly learn.

Health. "My face is so broken out that the boys won't ask me for a date."

"I wish I dared to ask the doctor what I could do about my bad breath. I taste it, and I know it's terrible."

"I wonder if my monthly cycle is the way it ought to be."

"What would happen if I got mumps? I hear it affects your glands or something."

"I wish I wasn't fat. They call me Tubby, and I hate it."

"They say that the things you do now will affect your ability to produce children."

Sex-Marriage. "No one cares about a girl who is tall. I'd give anything to be five feet."

"What do you do if you don't care much about girls?"

"I wish someone would really tell us what the girls expect you to do on a date."

"I want to get married now. I can't see the point in waiting, but my family says I have to."

"What is wrong with me that I'm not sexually attractive?"

Education. "I have to get better marks. Otherwise, how can I go to college?"

"My folks are always after me to study, but I hate to study, so I don't."

"I'm terribly afraid in Mr. M's class. If he calls on me I'm too scared to answer him."

¹⁶ Remmers and Radler, *op. cit.*, p. 40.

"Will I be glad when I'm sixteen and can get out of school forever!"

"Good marks are terribly important to me. Other things really don't matter."

Vocation-Avocation. "Everyone says I ought to make up my mind about what I want to do. But I just haven't any idea."

"I've got to be a lawyer. Everyone in my family has always been a lawyer."

"My mother wants me to be a doctor, but I want to be a mechanic and make lots of money. I don't want to go to college and waste all that time."

"We always just watch television in our spare time. I don't have a hobby and I don't like sports."

Time. "I never can seem to find time to do my homework. I work at a job until nine, and then I'm too tired."

"Well, I don't know where the time goes. All of a sudden it's ten o'clock, and my mother makes me go to bed."

"I have basketball every day. And then I take dancing and music. And I'm a Girl Scout. And of course I have to help my mother. It seems like I'm always running from one thing to another."

"I try to use a schedule, but it won't work for me."

Discipline. "If I do anything more, they'll suspend me again. But who cares?"

"He told me to get out of his class and never to come back."

"My mother is too strict. She won't allow me out beyond eleven ever, even on dance nights."

"Let's try a little liquor at the school dance. Bring in a little excitement."

"It's the thing to do in this school. Everybody cheats."

Economic Status. "I'm sorry I fall asleep in class, but I have to work for my father until midnight, and I'm always so tired."

"My father is sick. I want to leave school so I can get a job."

"I never have enough spending money. All the other kids have more than I do."

"Sure, I'll supply all the money you need for the drive. Will one hundred be enough?"

Morality-Religion. "Is it right to do anything the boys want you to?"

"I worry because I don't believe some of the things my pastor tells us."

"How can you tell what you ought to do? My mother says one thing, and my friends say something else."

"I wonder if I'm a bad person."

"Science proves things that go against what I'm supposed to believe, so I get mixed up."

Social Relations. "I wish the boys would take me out. No one ever asks me for a date."

"I have only one friend, but really I don't care."

"The ones that I like treat me like dirt. They won't speak to me or give me a chance to join their group. I wish they would want me for a friend."

"I'm too young looking and acting for girls my own age."

Citizenship. "I just won't help out the town's paper drive. Why should I?"

"I expect to be civic-minded someday, but that doesn't have anything to do with me now."

"School elections are rigged, so why should I vote?"

"School spirit is out of date. No one cares about that sort of thing any more."

Home-Family. "I wish my folks wouldn't keep trying to pry into my affairs."

"My mother is always telling me I ought to do better in school and go out with girls more and all that. She nags me all the time."

"My mother and father aren't ever home. I have to get all my own meals. They don't care."

"My folks are too strict. My mother makes me wear stockings, and she won't let me use any lipstick but the colorless kind."

Unifying Philosophy. "I wonder if it feels better to be old than to be my age."

"I wonder what I'll be like in ten years."

"I keep wondering if I'm all one person or lots of different people."

"I wish I knew just what I was going to do after school the way Sam does."

"I wish so many things weren't so mixed up."

We recognize that the twelve problem areas are extremely arbitrary and that they overlap to a marked degree. Very often the comment encompasses two areas, and sometimes three or more.

Havighurst, in his extensive study of developmental tasks, found

that a student who achieves well on one task tends to achieve well on others, and that the less successful youngster is consistent in his poor achievement. Good achievement also seems to carry through from age to age with a given person. Very few appear to reach high achievement on one task and poor on others, or vice versa. "Attitudes toward people and certain other qualities of personality that are emotional in nature appear to be most firmly associated with developmental task performance." Boys differ from girls on the personal characteristics.¹⁷ This study shows, as would be expected, that the student who is generally well adjusted is able to cope with the developmental tasks as he meets them.

Individual Students

Thus far we have talked about students generally. Of course each student in the class adapts his conception of the needs of life to his own particular circumstances, and meets life's problems in his own particular way. Let us look at some of the students one teacher found in his class.

Jane. During the summer Jane had polio. She had become badly deformed on her left side, and she seemed extremely unhappy and ill at ease in class. During the first test the teacher discovered that Jane could not write coherently. In talking with Jane he learned that she was in terror lest she should not graduate with her class. The fact remained that she could not recite in class, nor could she write legibly or intelligently.

Lu. Lu was small and extremely pretty and attractive; she was sociable, seemed to have many friends, and participated in many clubs and sports. But she daydreamed, never prepared her lessons, and had been cutting classes. Her class work remained always just passing. She said frankly that she never took a book home because she could not gain anything from studying if she tried.

Sammy. The boys in the class seemed to keep away from Sammy. The teacher had heard rumors of a sex incident in which Sammy was involved. Sammy had always been very popular until that time, but now he was becoming withdrawn and silent. He looked thin and often had difficulty in concentrating on class discussion.

¹⁷ Havighurst, *Human Development and Education*, pp. 325-326.

Sarah. Sarah always wrote beautiful papers and examinations, showing a brilliance far beyond her years. But in class she rarely spoke and never seemed at ease if she had to work with others. She always entered and left the classroom alone. She rarely raised her eyes in class. She pretended she knew nothing of any point mentioned in class, although when she wrote on the same topic, she always performed brilliantly.

Norman. Norman was a good student, but he was often late for class and had a way of forgetting some important matter, such as books or reference material. He seemed unaware of the inconvenience he caused. Sometimes, when the teacher or a student was demonstrating a particularly difficult matter and had gained the attention of the class, Norman would burst through the door, upsetting the whole demonstration. He would shuffle to his seat and look innocently around as everyone stared at him. Both in class and on tests and papers he performed extremely well.

Cary. Cary was tall and handsome, captain of the football team, and would probably be valedictorian of his class. He had many friends among boys and girls, and the teachers liked his manners and his general humility. His father had a small secondhand shop downtown, to which Cary took his wealthy friends as casually as though it were a mansion. The teachers came to expect top performance from Cary, and the science teacher had already found a college scholarship which would further Cary's aim of becoming a physicist.

John. On most examinations John scored the highest grade. He knew far more about every matter being considered than anyone else in class. He worked and studied and always seemed to shine when he had performed well. On the rare occasions when he failed to excel, John became very depressed. He would refuse to respond for the rest of the class period, appearing close to tears. His physical stature was markedly slight; he could not excel in sports.

So it goes, up and down the room. Nancy is miserable because she cannot buy a new formal for the dance, and Priscilla is elated because George has asked her to the dance. George is worried about how he will pay for the tickets, and Bob is wondering whether or not he will be forced to take a drink with the boys outside of the gym. The talented teacher senses the deeply felt and the superficially felt matters and teaches accordingly. He realizes that somehow he must aid each

student to move forward, according to his ability, to the realization that thinking about his courses has as much value in his life as other matters. But the teacher cannot be impatient. He must be willing to move ahead like the tortoise.

A description by Jacques Barzun puts some of these thoughts into other terms.

It is exasperating, but consider how the student feels, subjected to daily and hourly stretching. "Here am I," he thinks, "with my brains nicely organized—with everything, if not in its place, at least in a place where I can find it—and you come along with a new and strange item that you want to force into my previous arrangement. Naturally I resist. You persist. I begin to dislike you. But at the same time, you show me aspects of this new fact or idea which in spite of myself mesh in with my existing desires. You seem to know the contents of my mind. You show me the proper place for your contribution to my stock of knowledge."¹⁸

How the Teacher May Know His Students

It is at the beginning of the mutual learning experience that a teacher most wants to know what individual students feel and care about. His need to keep abreast of adolescent concerns gradually opens up to him one of the joys of teaching. When a teacher is assigned his classes at the start of a school year, he is often informed of the general academic level of the group. Since the students may be grouped also by vocational aims, he has insight into some group needs and desires. Beyond the academic level and the vocational goal, he probably knows little about the group or the individuals within it, except as he knows something of their developmental problems. The teacher must discover as much as possible as quickly as possible about his students. We offer here a brief discussion of some of the most common means available for obtaining information about students. It is intended as an introduction for the teacher, not as a complete guide to all necessary background.

The Cumulative Record Folder. The purpose of a cumulative record is to gather in one place all pertinent information about a student. The use of this central record by teachers, administrators, and personnel workers affords them understanding of each youth, thus

¹⁸ Jacques Barzun, *Teacher in America*, Little, Brown & Company and Atlantic Monthly Press, Boston, 1945, pp. 19–20.

providing them ways to enhance his educational and personal growth throughout his years in school. The record is a confidential file; those who are concerned with the student add to it each year. It is usually maintained by clerical personnel in the guidance office or in the office of the principal.

Most teachers have no time to study the cumulative records in detail for all students. A quick glance will, however, offer a brief picture of grades, test scores, activities, home background, and personal conduct. Usually this information is filed from the time the student enters school in grade 1, and includes the following: first, personal information about the family; then, school academic records such as grades, honors, work habits; psychological information including comments and anecdotes by previous teachers, standardized test scores on intelligence or academic aptitude, personality, special aptitude, vocational interest, and achievement; health information; and finally, work experience, vocational plans, special-hobby interests, and extracurricular activities. Most books dealing with guidance and methods of teaching contain detailed descriptions of cumulative records.

Observation. Observation of each student is the best way to become aware of his feelings. Watching and noting a student's reactions aid a teacher to understand him. Furthermore, the teacher is often approached by students for counseling in matters of academic concern and sometimes in personal difficulties. Although we feel that it is not the job of the regular teacher to counsel on personal matters, it is his duty to refer the young person for help, usually to the guidance department. In dealing with such matters, even so briefly, the teacher is made aware of the frets and worries of students as they meet life's problems. The teacher who observes and listens learns much about adolescents.

Teachers should also read local newspapers in order to keep abreast of community affairs. Relating class learning to a community concern makes it easier to awaken student interest. The sports pages and society pages will help the teacher to understand the out-of-class activities of his pupils. Although the teacher cannot be expected to attend all school functions, he should make an effort to be present at the major affairs in his school, and he should attend in a receptive spirit, hoping to attain a new insight into the feelings and the mores of young people. If a teacher has special abilities and interests, his talents may be used in a coaching job or in sponsorship of an activity.

If he has time for personal interviews, he will find that the conversations teach him much about boys and girls. A teacher who wants to observe and understand students will find plenty of opportunities.

Characteristics of good observation, as established by Traxler, ostensibly for a counselor but adaptable for the teacher, are as follows: the behavior recorded is important to the observer; the description of behavior is separate from interpretations or recommendations, which should be made only after extensive observation; interpretation is written separately from description of behavior; the record is cumulative.¹⁹ Other criteria might be brevity, describing behavior within its setting, and immediate recording of behavior. Whether the observation occurs in the classroom situation or in a more personal relationship, the teacher may note behavior related to group participation, special abilities, initiative, reactions to frustration, and reactions to problem solving (which are discussed in detail in the chapter on evaluation). For a more complete discussion of observation Ruth Strang's book on counseling technics will be valuable.²⁰

Written Reports. The autobiography is a popular source of information about students. An incoherent written report reveals little, however, and the teacher must outline the content to be expected. For instance, a teacher who asks a student to write about his summer vacation should suggest that he explain how he feels about a given aspect of his vacation or work experience and also what he learned about people during the summer. Naturally the teacher should promise that the information will remain confidential; he will use in class only the general understanding he has gained from the reports.

The autobiography may indicate student values and dissatisfactions. It shows a good deal about the way an individual perceives himself and his world. For a more complete description the reader may consult G. G. Starr's article on autobiography.²¹

Questionnaires and Check Lists. There are a number of questionnaires and check lists on the market today designed to gather informa-

¹⁹ Arthur E. Traxler, *The Nature and Use of Anecdotal Records*, Educational Record Supplementary Bulletin D, Educational Records Bureau, New York, January, 1939, p. 31.

²⁰ Ruth Strang, *Counseling Technics in College and Secondary School*, Harper & Brothers, New York, 1949, chap. 2.

²¹ G. G. Starr, "An Evaluation of Student Autobiography as an Aid in the Guidance Program," *Education*, vol. 63, pp. 40-47, September, 1942.

tion which will promote the understanding of individuals. Discovering major areas of concern to the students in a particular class may be effected through the Mooney Problem Check List.²² No special training is needed to administer or score this check list; yet it reveals student problems in a number of areas. Another useful check list of similar nature is the SRA Youth Inventory for pupils in grades 7 to 12.²³

A teacher-made questionnaire may be more beneficial. One questionnaire used in a United States history class included the following: name, age, birth date, birthplace, address, parents' names and occupations, number and ages of siblings, hobbies, radio and television programs followed regularly, magazines and newspapers read regularly, musical instruments played, sports, outside employment, travel within and outside the United States, historical places or monuments visited. This questionnaire was administered in only a few minutes of class time, but it afforded the teacher valuable information.

Sociograms. This device is a way of discovering social relationships and isolates in the classroom. The students are requested to indicate three choices for associates. From the choices the teacher may note unchosen students, leaders, and subgroups. A comparison of findings with other teachers at the secondary level may be necessary, since sometimes a student may meet his associates in only one class.

The questionnaire may be very simple. The first question may be, "With whom would you most like to work in a small group? Go with on a field trip? Sit with at the cafeteria?" The request may be to indicate three or four choices. The second question may ask, "With whom would you prefer not to work? Play?" and so on. The teacher then takes a piece of paper and on one side makes triangles with each boy's initials, on the other circles with each girl's. Lines are then drawn to indicate choices, with an arrow pointing toward the choice. If possible, leaders should be near the middle, isolates near the periphery. A detailed description of a sociogram diagram may be found in J. L. Moreno, *Who Shall Survive?*²⁴ From the findings the teacher should

²² Ross L. Mooney, *Problem Check List*, Ohio State University, Columbus, Ohio, 1944.

²³ H. H. Remmers and others, *SRA Youth Inventory*, Science Research Associates, Inc., Chicago, 1949-50.

²⁴ J. L. Moreno, *Who Shall Survive?* Beacon House, Inc., New York, 1934, p. 35.

gain some understanding of the unchosen, pairs, stars (the leaders or often-chosen children), triangles (three who choose one another but no one else), chains (three or more children who choose one who does not reciprocate, he in turn choosing another who does not reciprocate), and also intersexual attractions and small subgroups.

* * *

As in other chapters, we have not intended just to convince the reader of the importance of the material here included. We have hoped to increase his interest about adolescents and to help him to learn something about them. We have aspired, in other words, to assist the reader to think about young people, to relate the attitudes and the information we have presented to his own, and to arrive at hypotheses and judgments wherever possible.

What, for each teacher, are the implications of the likenesses among adolescents, we cannot hope to predict, nor can we foresee how he will determine their differences. If the teacher says, "Oh yes, I know that all adolescents need to feel success," and then continues to give examinations which raise terror in the youngsters and to base standards on, "You had better study or you won't pass," we can only realize that he has felt no need for what has been said here, that he has memorized the ideas so as to give them lip service but has acquired no real knowledge from his study of adolescence.

LEARNING MATERIALS

Some Cases

1. Larry sits at the back of the room and never participates. The first teacher says, "He has no interest in being part of the group."

Milly is shy and hesitant. The second teacher says, "I make sarcastic remarks to her. They stir her up."

Cindy never does well in her work. The third teacher says, "She's just stupid. I ignore her."

Susie does everything right, trying in every way to please the teacher. The fourth teacher says, "I attempt to show personal interest in her and in all my students."

How does each of these teachers feel about one of the needs of individuals?

2. The teacher said, "Of course I know the students differ."

The supervisor said, "Bernie is very near-sighted and just can't read fast. Cathy is the daughter of a brilliant professor and has read over one hundred

adult books. Janie loves horseback riding; all she thinks of is horses. In this unit on the essay, what did you expect of these three students?"

The teacher replied, "Every student in my class must be able to identify the essay, to name five leading essays in English, and to write the essential characteristics of the essay." What does this teacher really believe about students and their differences, and how might he treat these differences?

3. The teacher was concerned with teaching letter writing. He said, "Hardly anyone knows how to write a good letter any more. This is one class that is going to learn. Get out your pencils and paper." He did not consider adolescent needs or developmental problems. What could he have said to include both?

4. A student asked a question of another student who had been talking. The teacher said, "Gary, you know you don't know anything about Napoleon's death. Don't bother the class." The teacher appeared to understand the needs of every adolescent; for himself he gained security, belonging, success—but at the expense of Gary. How could he reverse this situation?

5. The teacher had heard that he must know his students; he therefore used records, reports, observations, questionnaires to gather information. Then he asked his supervisor, "What do I do with this? Now that I have it, I'm not sure what it is for." How should he have approached this task?

Some Controversial Thoughts

1. "Youth is always important because it determines what the future will be; . . . [today] all nations are fighting for the loyalties and minds of their youth."²⁵

2. The teacher may use so much time "in knowing John that John will never succeed in knowing mathematics."²⁶

3. "If the needs of youth are not met, we will be faced with more and more drop-outs, more serious cases of underachievement, more problem students, and the ultimate failure of secondary education itself."²⁷

4. "Behavior is basically the goal-directed attempt of the organism to satisfy its needs as experienced, in the field as perceived."²⁸

5. "Teenagers begin to look outside their families for models or objects of identification. Teachers can and do play this role."²⁹

6. "Most school people who have taught in both elementary and secondary schools are willing to admit that in many ways it is easier to work with ele-

²⁵ Maureen Daly (ed.), *Profile of Youth*, J. B. Lippincott Company, Philadelphia, 1951, pp. 255-256.

²⁶ Jacques Maritain, *Education at the Crossroads*, Yale University Press, New Haven, Conn., 1943, p. 13.

²⁷ Kenneth H. Hansen, *High School Teaching*, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1957, p. 50. Reprinted by permission of the publisher.

²⁸ Rogers, *op. cit.*, p. 491.

²⁹ William W. Wattenburg, *The Adolescent Years*, Harcourt, Brace and Company, New York, 1955, p. 431.

mentary school children than it is to motivate learning among secondary school pupils."³⁰

7. "What any child learns in a given classroom situation is an individual matter which can be understood only in terms of the experience and attitudes he brings to it."³¹

8. "Mind and body, environment and experience are somehow combined and integrated through profound developmental forces, which always produce a unique individual."³²

Suggestions for Further Reading

1. Garrison, Karl C.: *The Psychology of Adolescence*, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1946. A general discussion of this period.

2. Havighurst, Robert J. and Hilda Taba: *Adolescent Character and Personality*, John Wiley & Sons, Inc., New York, 1949. Reports from the Committee on Human Development, the University of Chicago.

3. Hollingshead, August B.: *Elmtown's Youth*, John Wiley & Sons, Inc., New York, 1949. Impact of social classes on adolescence.

4. Johnson, Earl A. and R. Eldon Michael: *Principles of Teaching*, Allyn and Bacon, Inc., New York, 1958. Chapter 2, "Studying Children."

5. Landis, Paul H.: *Understanding Teenagers*, Appleton-Century-Crofts, Inc., New York, 1955. A sociologist looks at youth.

³⁰ Crow and Crow, *op. cit.*, p. 39.

³¹ Peter Blos, *The Adolescent Personality*, Appleton-Century-Crofts, Inc., New York, 1941, p. 492.

³² Arnold Gesell and others, *Youth: The Years from 10 to 16*, Harper & Brothers, New York, 1956, p. 17.



4

The Method of Critical Thinking

While the teacher may agree that reasoning and judgment are desirable abilities in students, he may wonder what his role should be in bringing about these phenomena. The teacher cannot, of course, succeed with all students. When they as a group appear to fail to follow through the various steps of thinking, the teacher returns to the task of making them aware of their need to solve problems.

It is at the first stage that the method of problem solving and critical thinking becomes apparent. The teacher looks to his aim for reasoning and judgment. Next he looks to the needs of adolescents and to subject matter; and he forms a coalescence of these two which brings about his aim. The controversy between student needs and vital subject matter is an illusion. There is no real dichotomy between "needs" and "subject matter." The point is that the talented teacher forms a coalescence of them; he demonstrates to the students how subject matter meets their

needs. In order to do so, he must have a thorough and extensive background in his own subject matter. He shows that learning about chemistry offers more information for the solution of health problems than a paper-backed "health book." He shows that learning about biology is better preparation for understanding sex problems than is television. He shows that learning about literature—English and foreign—provides more knowledge about the working out of social and moral problems than do the rumors of the gang. He shows how learning about mathematics suggests far more about meeting economic problems than trial and error. The teacher proves that thinking about the material to be studied will be more valuable to students than anything they have yet encountered. In other words, he himself thinks about *Hamlet*, and then he points out how *Hamlet* meets them on their own ground. The students awake to new and broader interests. A teacher in the ninth grade may begin a study of the stars with a story. "A legend about Orion says he was a giant and a hunter, who was blinded. An oracle told him to expose his eyes to the rays of the rising sun. He did so, and his sight was restored. He lived many years as a hunter, and after his death he was placed in the heavens as a constellation. If you look at the winter sky about February first, you can see his belt up there. Of course," the teacher continues, "the only time you people look at the stars is when you're walking with your best girl or boy friend. Then they are just romantic, though some of you can find the Big Dipper and a few the Little Dipper. If you were lost at sea or even in the woods, the stars could help you. Other than that, you probably wonder if they have any value in your life except to promote romance."

But the teacher hopes to broaden horizons and to guide the young people to discover new areas of interest as they delve into their study. Learning about stars remains not at the level of young love, dates, and social acceptance, but expands in all directions.

Meaning of Coalescence

The adolescent, we have said, needs physical safety and comfort, love (from others and for others), security, belonging, success, varied experiences, self-integration, identification with his peers, independence. What he wants to consider or study in class is the kind of learning which will help him to get all these good things. It is the teacher's

hope that by confronting adolescents' desires with pertinent subject matter, he may lead them toward reasoning and judgment. This is the meaning of coalescence. In the material to be studied the teacher notes constantly the elements which will involve his pupils in thinking about their needs in the developmental tasks.

Coalescence at the Anxiety Stage. Let us suppose that an English class is to consider one of Shakespeare's sonnets in a unit on poetry. The teacher and students have already investigated sonnets in general. Perhaps the teacher began by reading aloud Sonnet 116 so that the students might hear the beauty and rhythm of the poem. Then he said, "This is about love. Do you think that a man could write words like this to another man? Some people think that is what Shakespeare did. Or do you think it has to be written about a woman? You know, your parents have probably told you that if you think you are in love, you don't know what love really is. Do you think you do? Could you agree with Shakespeare that

Love's not Time's fool, though rosy lips and cheeks
Within his bending sickle's compass come;

or are your parents right that you think pretty much about rosy lips and cheeks and not very much about

O no! it is an ever-fixed mark,
That looks on tempests, and is never shaken;
It is the star to every wand'ring bark,
Whose worth's unknown, although his height be taken?

Shakespeare uses words that are different from the words in those popular ballads I hear you humming. Do you think that he says anything deeper and better, or don't you really know about love after all?"

This introduction should be enough to arouse anxiety in many students. By relating the material to what he knows his adolescent students are caring and worrying about (love and success, within the developmental problem of sex-marriage) the teacher helps them to take a short step toward thinking. But the method of critical thinking is self-perpetuating, and the very process of thinking about this sonnet, which begins with the preoccupations of young love, awakens in students awareness of new interests—about the sonnet, about Shakespeare

and his writing, about other sonnets by other poets—so that they realize they want to learn more deeply and widely.

The real point of investigating man's cultural heritage is to enlighten a modern individual about ways to solve problems that others have already met, in the hope that their solutions will aid him and that eventually he may be able to pass on his own judgments to others. All problems which concern adolescents revolve eventually about their needs within the developmental problems. Learning subject matter means feeling anxiety about it, thinking about it, and finally forming hypotheses and judgments about it. But anxiety for learning occurs only when the individual senses the relationship to himself in the material. Here are every student's ready-made problems which he longs to solve. In creating coalescence at the first step of problem solving, the teacher presents those elements, thoughts, and activities in the material to be studied which point up new ideas about the developmental tasks of the students.

Rogers warns that the individual's "reaction is not to reality, but to the perception of reality."¹ It makes no difference how marvelous or inspiring the teacher may find his subject matter if the student does not so perceive it. If the teacher forms the coalescence of the students' needs with the subject matter, many an uninterested youngster will perceive the reality of the situation and decide that the problems it presents are worth solving.

After careful thought a teacher decides which needs in which of the developmental areas are a part of his subject matter and how the material can offer adolescents some new ideas. In a unit on the literature of reading and writing in an eleventh-grade college English class, the teacher attempted to use coalescence of adolescent needs with his aim to promote reasoning and judgment about the subject matter. He decided that a study of reading and writing relates to the developmental areas of education, vocation-avocation, and unifying philosophy. He particularly emphasized the adolescent needs of security, success, varied experiences, and independence because they may be partially met by reading and writing. He said, "Do you think that ability to read and write well makes very much difference in your life? Of course it will improve your marks in school and may make a difference in your

¹ Carl R. Rogers, *Client-centered Therapy*, Houghton Mifflin Company, Boston, 1951, p. 492.

chance of entering college and thus of getting the job you want sometime. A job will enable you to be on your own and to do some of the things you want to. You might be interested to know that Funk has found that tests given to leaders in many fields show that as a rule these men and women possess vocabularies superior to those in lesser positions.² But have you ever stopped to think very much about what real ability to read and write well might do for your life other than just make you more successful?

“‘Crafty men condemn studies, simple men admire them, and wise men use them.’ Bacon said this. He explained that if you expect to become wise and feel that you can do and say wise things, you must be able to use your studies. In some of the books which you may choose to read in this unit, you should find other ideas which can help you to understand just what good reading and writing will do for your education, your job, and your whole life.”

Coalescence at Later Stages. The details of how to put into effect the rest of the steps of problem solving and judgment are outlined in the chapters on technic. Coalescence of adolescent needs in developmental tasks with subject matter is evident throughout the teaching of critical thinking. However, as has been described, it is at the point of showing the students their anxieties that the greatest emphasis is placed upon coalescence.

When the teacher has pursued the matter of the coalescence of needs with thinking about subject matter, discussing it with students to discover whether they begin to feel anxious about what is to be studied, he forms a picture of how much interest has been aroused in class members. In order to do so, he may have to draw out students who have said nothing and he will need to become attuned (by forcing himself to watch for it) to the feeling of the group. If he discovers that about half the members of the group are anxious enough to move ahead, he may allow them to do so while he turns back to the anxiety stage with the others. Sometimes he will return to reviewing with the whole group if he finds that they fail to grasp their needs. Of course, very often individuals will remain whose interest will not be stirred; how to deal with them will be discussed in detail in the chapter on intensifying student learning. In order to become attuned to the feelings

² Wilfred Funk, *The Way to Vocabulary Power and Culture*, Wilfred Funk, Inc., New York, 1946, p. 1.

of the group and the individuals in it about their study, the teacher must understand cooperation in the classroom. We turn, therefore, to this matter.

Cooperation

Learning theorists have largely left the matter of the atmosphere of the learning situation to educators and experts in the field of group dynamics. However, some of the psychological and philosophical principles already discussed point to agreement with the theory that there must be an atmosphere of cooperation in the classroom. Some of these principles include the need for active participation of the learner, for his personal involvement, for his definition of the problem as essential to learning. Also cited are the emphasis upon freedom for the student and upon the dignity of the individual, respect for personality, and freedom for experimentation. Finally, there is the need for the teacher to consult young people and for pupil-teacher planning. All of these aims have been variously quoted previously from Hilgard, Brubacher, Ferber, and Kingsley.

Evidence for Cooperation. Smith writes, "Democratic leadership . . . has come to be accepted as the only type of leadership that the professional teacher may offer."³ There is no exact definition of democratic leadership. However in a classic study, Lewin, Lippitt, and White contrasted groups led by autocratic, democratic, and laissez-faire leaders.⁴ The definition of the autocratic leader is, as would be expected, that he dominates and directs and decides all issues; he controls and runs the group as he desires. A laissez-faire leader is also easily defined; he does nothing, allowing the group to progress exactly as the members desire, with no imposed restrictions. The democratic group, on the other hand, is run cooperatively. In Lewin's experiment the democratic leadership was most effective. This group, which, when necessary, works without the leader, is most effective in determining policy. Its members show the most change in behavior; they take initiative and assume responsibility.

³ Henry P. Smith, *Psychology in Teaching*, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1954, p. 250.

⁴ Kurt Lewin, Ronald Lippitt, and Ralph K. White, "Patterns of Aggressive Behavior in Experimentally Created Social Climates," *Journal of Social Psychology*, vol. 10, pp. 271-299, 1939.

In the democratic group the leader is, in truth, the leader. He sets certain limits upon the subject matter to be studied and upon freedom in classroom conduct. He insists that students ought to think and learn. But he emphasizes the idea that it is the students who must learn; he is unable to do so for them. He cooperates with students in allowing them freedom to experiment, to discover, and to arrive at personal judgments. As Hopkins says, "Democratic interaction is based upon mutuality of relationship among individuals."⁵

Many studies by theorists in group dynamics (such men as Lewin, Lippitt, Cartwright and Zander, Benne and his associates, Klugman, and Cunningham) point to the effectiveness of democratic leadership and cooperation in the group situation. For example, a study quoted by Ojemann shows that students prefer "the democratic (planning-with-the-pupil) type of procedure to the domineering, autocratic type."⁶ Lippitt in another study found the feeling of group "belongingness" stronger in democratic than in autocratic clubs.⁷

Although little experimental evidence has been found to prove transfer in this area, it is hoped that by applying the principles in a variety of situations (a generally accepted prerequisite to transfer of learning) the student will become better able to function in a democratic society. Some evidence for this idea might be found in separate studies by Lippitt and French, who found that children and young people adapt to democratic and autocratic atmospheres produced by the leaders.^{8,9}

Cronbach, in writing about the autocratic teacher in experimental studies, says, "Almost without exception, the dominative leaders are taught to be harsh, to use hostile comments in criticizing students, and to discourage student initiative. This means that we lack research on friendly, adaptable teacher control, which is the pattern most teachers

⁵ L. Thomas Hopkins, *Interaction: The Democratic Process*, D. C. Heath and Company, Boston, 1941, p. 10.

⁶ Ralph H. Ojemann, *Personality Adjustment of Individual Children*, Department of Classroom Teachers, American Educational Research Association of the NEA, Washington, 1954, pp. 1-31.

⁷ Ronald Lippitt, "An Experimental Study of the Effect of Democratic and Authoritarian Group Atmospheres," *University of Iowa Study of Child Welfare*, vol. 16, pp. 45-195, 1940.

⁸ *Ibid.*

⁹ J. R. P. French, "Organized and Unorganized Groups under Fear and Frustration," *University of Iowa Study of Child Welfare*, vol. 20, pp. 229-308, 1944.

are presently trying to use.”¹⁰ With lack of evidence, then, to support either position conclusively, we suggest only that in its very nature (no matter how kindly, friendly, noncritical the teacher) autocratic leadership imposes ideas in place of helping people to discover theirs. This is a vital difference.

Cooperation in the classroom entails insistence by the teacher upon learning subject matter, but at the same time recognition of student needs for which this subject matter offers help, and constant aiding of students in the process of problem solving and judgment. Thus the coalescence mentioned previously occurs through the teacher’s democratic leadership.

Furthermore, implicit in the definition of democratic process is respect for individual personality. This kind of leadership must entail understanding of both individual and group needs and wishes. To be a really democratic leader, the teacher must be attuned to the feelings of the group and of its individual members.

In the autocratic atmosphere the teacher imposes both outcomes of learning (“You ought to know all the causes of World War II”) as well as the approach to be used at each stage (“Today we shall talk together about the cause of World War II”). Even though, as Dewey says, “good teachers will use devices of art to cover up the imposition,”¹¹ the chances for real problem solving, which must entail student definition of problems and student-determined judgments, are very limited. It is entirely possible that a student may be aroused by something in the subject matter and the teacher’s presentation, and that he may then define his own problem, and by working to solve it, evolve his own judgments. However, if he does so, his thinking occurs outside of the regular “teaching” by the teacher, and his judgments never find their way into examination papers, even though these same judgments may very well be the most important thing or the only thing learned about the topic under discussion.

The democratic teacher, on the other hand, uses and emphasizes the process of problem solving by allowing the student enough freedom not only to determine his problem but to formulate his own personal judgments. While the teacher obviously does direct, because he leads

¹⁰ From *Educational Psychology*, by Lee J. Cronbach, copyright 1954 by Harcourt, Brace and Company, Inc., and reprinted with their permission, p. 456.

¹¹ John Dewey, *Experience and Education*, The Macmillan Company, New York, 1956, p. 4.

the student to do this very thing, he cooperates by helping him to do it. Because of the leadership inherent in the process, the judgments which are formed are made not in isolation, as in the autocratic situation, but with help from the teacher, so that the student investigates thoroughly while considering the hypothetical character of his judgments.

Democratic leadership, as it creates in the youth a sense of its presence, helps to meet his needs in the situation. He should recognize the love of teacher and peers; he should feel security and yet independence within the group, a sense of belonging to it, and success as he plays his part; and he should in turn offer love if the leadership is effective. He should feel free to admit his needs and to seek actively to meet them.

The teacher may capitalize upon the gregariousness which has been described as a special characteristic of adolescents. Already the class may be divided into five subgroups plus a number of lone individuals. With no attempt to break down the subgroups, the teacher, through cooperation with the students, helps them to offer love and companionship to others besides those in their immediate groups.

We turn now to ways to instigate and improve the cooperation and democratic leadership.

The Sense of Cooperation. First, everyone must feel the democratic atmosphere. If the coxswain sets one pace and the oarsmen pull at another, chaos results; but if the pace is agreed upon then the result will be smooth speed forward; the crew will be "participating persons."¹²

In order to be certain that he is participating with his students, the teacher may need to examine his own basic desires in teaching. How much need has he to win love, security, a sense of belonging, success, from his students? Does he feel he will gain these through running the whole class? If he recognizes in himself a strong need to be the teacher-authority over his students, to force them into the role of follower and obeyer, then the task of learning to function as part of the group will mean real soul searching. He must honestly say, "We all desire the same results. If we remember this, we can cooperate." There is no implication in the concept of cooperation that the teacher does not lead, only that he is not an autocratic leader.

¹² Ruth Strang, *Group Activities in College and Secondary School*, Harper & Brothers, New York, 1946, p. 1.

As an example, let us consider a class in dramatics. This is an elective class, the purpose of which is to learn about drama and dramatic forms rather than to turn young people into actors. The class has agreed to produce *Our Town*. There are approximately twenty-three parts, which means that in the class of sixteen everyone will play at least one part. Of course scenery is not a problem.

Mrs. B, the teacher, says, "Can we talk a little bit about what the play means to you? You have all read it. Now we agreed we want to get the feeling of what it is trying to tell us, of what it is all about, because if we hope to play the parts we need to sense what the play is trying to say."

The teacher is not pretending; she cares what the youngsters think about *Our Town*. She feels no need to force upon them any notion or idea of her own, though at times she may preface a remark with, "Have you considered this aspect?"

The class members warm to the discussion, making suggestions, such as, "It really is just a picture of life in a small New England town in the early part of the century," or, "Wilder is trying to prove that 'our town' is rather an unhappy place." This suggestion is met with much dissension.

Finally Mrs. B asks, "Have you considered this idea? Perhaps the town in the play is merely a picture of life and death, of the way life moves on? Do you wonder sometimes if life just rushes ahead, not really caring too much about each one of you as a person?"

Through the discussion a feeling grows in the minds of the students that they and the teacher are exploring *cooperatively* the possible meanings to be found in the play. The students gain this impression because in the mind of the teacher, also, a real exploration is occurring. In other words, the teacher honestly desires to help the students to experience every possible idea, and as a result each individual senses the atmosphere of participation.

Mutual Help and Respect. There must be an impression of mutual help and respect. We talked only recently with a teacher who asserted, "I'll make this low group get this grammar if it's the last thing I do."

And a student in the class said of his teacher, "She's a phony. She really doesn't know anything, but she tries to pretend she does."

Much discussion today centers about the "bad" teen-agers, about how much worse they are than when "I was young." But the teacher cannot gain the results he wants if he lacks faith in his youngsters—

faith that they possess the ability to accomplish something and that they will work determinedly at learning what is important to them. Only such an approach to his students can lay the foundation for mutual respect and help. Adolescents' respect has to be sought; we are ostriches if we think it is given automatically.

The teacher must begin with at least a measure of belief in his students. Mrs. B "bets her life" that students are able to understand and work through, not only the meaning of the total play, but the parts as well. If a teacher knew in his heart that he did not hold such a belief, one single experience in allowing students to attempt to discover their own answers, with leadership, should convince him of their great potentialities. The talented teacher will be heard to say in the teachers' room, "I am constantly astonished by what the students can do and how they will work and how well they think. It amazes me that boys and girls so young can do so much."

As the class in dramatics moves forward Mrs. B makes no attempt to become a director in the usual sense. A finished performance is not her aim. When the young people have chosen their parts, by mutual consent, Mrs. B says, "Let's take some of the important people in the play and be sure we understand them. Do these characters have anything to teach us about living? Do they go about solving difficulties in a way that we might want to copy? What do they feel inside? You know, understanding how other people feel inside is a wonderful way to learn to get along with others. Let's take Emily first."

In other words, as she attempts to help the class, Mrs. B demonstrates that she respects their ideas and their ability to work out acceptable answers to every important question raised. Eventually the democratic atmosphere which she creates is reflected by most students toward one another.

Mutual Planning and Sharing. There must be mutual planning and sharing, what Strang calls "planned, shared experience."¹³ By such cooperation teachers and students feel that they are participating persons. The process of planning and sharing by teacher and student helps to produce coalescence, the basic method of critical thinking. The teacher cannot plan everything and pass it to the students to accept. Together they must recognize their problems and make attempts to solve them, the teacher leading and aiding but giving the youngsters freedom to try.

¹³ Ruth Strang, *op. cit.*, p. 3.

"The contention that a 'we feeling' or high group morale, and an atmosphere of acceptance with mutual respect and confidence between teacher and students are conducive to maximum accomplishment of educational goals has firm support in research findings."¹¹

It has been evident in our description of the class in dramatics that the whole experience was planned and shared. The students probably did not determine the over-all aim of the class, which we have said was to learn and think about drama and dramatic forms. But in the early days of the class they and the teacher took time to consider the problems involved in studying drama. Their ideas ranged from "learning about how the dramatist builds up tension" to "learning how the people in the play overcome difficulties." If the teacher had an additional idea, she suggested it, but with no implication that it was superior to the ideas of the class. From this point mutual planning and sharing occurred in deciding upon the play, in considering some of the students' basic questions about it, in choosing the actors, and finally in acting the parts. It is important that the teacher in no way consider the atmosphere of the class a synonym for *laissez faire*. The democratic atmosphere stands as far from *laissez faire* in one direction as from autocratic authority in the other. Mutuality of the planning and sharing means direction but not force; it never means being so permissive as to give students "too much freedom."

Clear Thinking Through Special Aids. In the final stage of creating cooperation, young people are helped to think clearly. Although at first glance clear thinking may appear to be unrelated to cooperation, if we consider such matters as listening to one another, learning tolerance, and considering others' ideas, we realize that these ways of promoting clear thinking are at the same time ways of cooperating. By such paths the teacher leads adolescents from their dependence on their own peer groups and group ideas only to individual thinking and to the realization that being an individual is worth while. The teacher's stress upon consideration for others will also promote democracy.

The teacher first helps the students *to listen* to him and to other students. Often, as the teacher must help the students to realize, a hearer fails to heed what another says merely because his mind is already filled with planning what he himself will say when his turn

¹¹Thomas F. Stovall, "Lecture vs. Discussion," *Phi Delta Kappan*, vol. 39, pp. 255-258, March, 1958.

comes. Students will probably not be in the habit of attending, but if they are to learn, they must listen carefully so that they may take advantage of every idea offered. They need to respond to the "flavor as well as to the substance of words" and to the "quality of feeling and thinking of the speaker."¹⁵ The teacher will help students to become aware of the new needs aroused in them as someone else speaks, for if their minds are not alert and open, they will lose the opportunity for new learning. Besides, the students must not be expected to feel that whatever the teacher says is gospel and whatever their peers say is probably useless. They should learn to weigh carefully the ideas that both teacher and students express. They can do so only if they attend carefully.

Here are a few examples of the way a teacher promotes listening. After seeing a movie about ancient history, Jim remarked, "King Philip was Alexander the Great's son, wasn't he?" The teacher asked, "What did the rest of you learn about this?" When the members of the class corrected Jim, the teacher commented that it is difficult, even when listening intently, to hear all that is said.

As the teacher spoke in brief introductory lectures in history she often stopped and asked, "Is that right, Bob? Do you agree, Sylvia? Does it really make any difference, Tom?" waiting each time to give the class members a chance to comment. These questions were asked in an attempt to keep her hearers listening carefully.

In a debate the teacher helped all the members of the class to listen attentively by asking each one to prepare a rebuttal as though he were to present it. They discussed the reports, and the class realized how many of the points which were offered were lost by a large percentage of class members.

In a discussion the students considered Browning's "My Last Duchess" and its place in a group of short dramatic poems.

BILL: I thought these dramatic poems weren't supposed to have action, but you can see where this one does.

JANICE: I think we should talk about how awful the Duke is. Did anyone try to prevent this poor young girl from becoming his wife?

¹⁵ The Commission on the English Curriculum of the National Council of Teachers of English, *The English Language Arts in the Secondary School*, Appleton-Century-Crofts, Inc., New York, 1956. p. 254.

TEACHER: Perhaps we should try to consider Bill's point first and then return to Janice. Janice, would you care to do that?

JANICE: I don't know what he said.

TEACHER: We get these good ideas in our minds and then we want to jump ahead to them. But listening to one another, perhaps jotting down our new ideas for later reference, will help us all to keep on the same point and to be sure we discuss it as fully as we want to.

Besides learning to listen, students must learn to *weigh attitudes and information carefully*, and to seek added information or attitudes where their own are inadequate. At first they will have little conception of the differences between these two categories. They will probably accept a fact as the equivalent of an opinion. The teacher will need continually to question the kinds of ideas which are considered until students learn to do their own questioning. Gradually the difference between information and attitude will become apparent to them, and they will know, as they weigh an idea, what kind of concept it is.

As examples of how the teacher helps students to weigh the various kinds of ideas, let us return to the discussion of the poem "My Last Duchess."

TEACHER: I like this poem. It interprets what one diseased mind can do.

BOB: I'm not sure I think the Duke's mind is diseased.

TEACHER: Bob, would you say that my statement is information or attitude?

BOB: It's attitude, I guess.

RAY: Really there's information involved.

TEACHER: Of what value is my attitude to you?

BOB: It helps me to decide what I think.

BETSY: The Duchess was a beautiful young girl with a lovely personality. I agree with Janice that the Duke was horrible.

RAY: Betsy is giving an attitude too.

TEACHER: Can you think of something that is information?

CAROL: That the Duchess spoke kindly to everyone.

Thus in a discussion the differences in the various kinds of ideas expressed may be considered, and the students may learn the value of distinguishing among them.

A class in biology studied the effects of light and darkness and also of colored light on growing plants. They determined such results as amount of chlorophyll and amount of starch after plants were grown in darkness, in blue and red light, and in full sunlight. When the results of experimentation were recorded and students declared, for example, that lack of light lessens chlorophyll, the teacher warned that the conclusion was merely a limited hypothesis based upon one experiment. He helped the class to consider the difference between what might be called generally accepted information and a tested hypothesis which proved valid in one instance.

In a social studies class a movie was shown about a town government. With a running commentary voicing the idea that here was a really high-caliber town government, that all the men in it were devoted to their jobs and had no other interests, and that people walked its streets in an atmosphere of pure idealism, the camera showed men working at their various jobs. When the movie was over, the teacher asked the group to comment. It was clear that no one had watched the action which demonstrated a lack of the devotion to duty vaunted by the commentary, but that everyone had been swayed completely by the attitude of the commentator. The class was helped to consider how much of the interpretation was attitude, how valuable was this attitude, and how often other information and other attitudes were needed to understand the whole.

When *generalizations and questionable words* are injected into the discussion, the teacher must help his students to examine what they have said. Much poor thinking is based upon generalizations which would bear no test if they were examined. How often the teacher will hear generalizations, such as, "Everybody says that policemen are corrupt," and, "Shakespeare is very deep," and, "Ancient Romans all sat around and ate all day long!" Or he will hear questionable words used to verify a thought, such as, "He is anti-American because he's a Communist," or, "The whole child is what we teach to," or, "That trend is bad because it's socialistic." Like any statement, these ideas need to be examined when they are uttered. And as students realize how much of their thinking involves generalizations and questionable words, they will think more carefully and clearly. Teachers must scrutinize each student's statement in order to aid young people to

speak and thus to think precisely. Here are a few inaccurate statements made in various fields of study:

Biology: "All flowers bloom in the spring and summer if they are planted outdoors." The teacher questioned the speaker, guiding him to realize that his generalization could not be verified. The student's anxiety was aroused, and he offered to prepare a list of flowers which bloom in fall or winter.

Chemistry: "Water boils at 212°F." This statement is a dangerous generalization, as the teacher helped the class to learn after they had declared that their experiments proved this "fact." Later, when they had studied and experimented with differences in pressure, they revised their original statement.

Language: "La France est belle; son climat est tempéré; la vie y est bonne." (France is beautiful; its climate is temperate; life there is good.) The teacher, realizing that one inherent value in the study of a language is knowledge of peoples and culture, asked the speaker to consider the broad generalizations which he had made. The student was awakened to a sense that France is a composite of real people and that life there cannot be categorized in a few simple words.

World history: "In the Renaissance the people were reborn to an understanding of humanity." Here the teacher asked the speaker to consider definitions of two concepts, "the people" and "humanity." The student, in his effort to discover "the people" of the Renaissance, spent two class periods attempting to delimit the people who were affected by the awakening. The whole class undertook to discover the meaning of the word "humanity" and its application to the Renaissance.

Words which may need attention are: emotionally charged words—Communist, radical, leftist; broad words—freedom, liberty, education, friendship; and ghost words—cooperativeness, conformity.

Another important desideratum is aid to students in trying to distinguish between the kind of tolerance which says, "Everyone is right, and therefore every idea is right," and the kind which states, "Everyone has a right to his beliefs, but that does not necessarily mean that everyone is right." Accepting and defending the right of other people to hold their opinions (which means mutual respect) needs to be separated sharply in the minds of students from belief that every idea is equally as true and equally as valuable as every other idea. The confusion in this matter appears to be greater today than in the past,

possibly because of the supposed compulsion to agree with everyone and never to take a side and stand firmly for it. Thus when students are confused about the possibility of differing in opinion from their peers and their teacher, they need to be helped to distinguish between accepting another person's right to believe as he does and feeling that it is necessary to agree with him.

After engaging in research in United States history books, two students argued noisily about the traitorous activities of Benedict Arnold. One student had discovered in his reading that Arnold was no traitor but a psychotic personality; the other had learned that Arnold betrayed his country intentionally. The teacher allowed the two boys to propound their arguments until their excited voices disturbed students engaged in other kinds of research. Then he requested that the boys present the controversial findings, and called the class to attention for a moment so that they might hear the arguments. Quickly the class members took sides.

"We have here," the teacher commented, "two honest opinions which obviously cannot both be right. We can accept the thought that the researchers did their best and that each offered the best answer he could find. We can respect them for doing that, but we may easily find that we do not agree with their conclusions."

In the discussion of "My Last Duchess" the following statements were made:

JAN: John is mistaken in saying that the reference to Neptune is supposed to have a hidden meaning.

JOHN: Don't you see, Jan? It means that the Duke is a tamer, just as Neptune was.

JAN: I certainly think that is carrying guesses too far.

GERRY: But, Jan, it's so obvious that that is what Browning meant.

Aren't you being a little dense?

JAN: I think you are being too smart.

TEACHER: There isn't any answer, is there? We can see that both Jan and John have the right to their differing attitudes. Just because we do not agree with one another is no reason to refuse to admit that the other fellow has a right to believe as he does.

In a class in biology, Marty had reported on his study of the eagle as a bird of prey. When the teacher asked for comments only a few

noncommittal statements were made. "What about some of the rest of you?" he asked. "I know that at least one member of the class has had some firsthand experience with an eagle. Could you comment on Marty's ideas, Randy?"

Randy hesitated a long time. Finally he declared that "one or two of Marty's points might be wrong."

The teacher asked, "Why didn't you want to say this, Randy?"

"Because I don't like to disagree with Marty."

"Randy, and everyone else, it isn't always easy to disagree. But we have to stand up for what we know is right. If we show the other fellow that we think no less of him for having said what he did, we certainly won't hurt him by disagreeing as much as we shall if we pretend we agree with him, or if we let him go along with his ideas without suggesting to him where they may be false."

Thus during every class the teacher guides young people to distinguish tolerance from passive agreement.

Students must be aided, furthermore, *to weigh their present beliefs in the light of new evidence*. This is, of course, a part of the process of thinking. They must examine their own minds when they reject a new attitude or bit of information, to discover whether the rejection is based merely on their own desire to preserve a carefully rationalized set of thoughts which are dear to them. Or if the students are prone to state that they accept every new idea which is offered, they must be helped to examine their judgments to learn whether they have actually accepted the idea. They need to consider whether they are like the teacher who says that he believes in individual differences, then blithely directs his teaching to the "middle" of the group, expecting the same kinds of learning and performance from every student. Saying that one accepts a new bit of evidence may be very different from committing himself to it. Truly accepting the evidence means that it alters his behavior, his other thoughts which relate to what he has accepted, and his own system of ideas and values. Students must be helped to think deeply, to look inward to discover the implications of accepting a new idea, whether in scientific investigation or in informal discussion.

In summarizing the discussion of "My Last Duchess" the teacher commented, "It seems to be pretty generally agreed that Browning's poem is a real drama in fifty-six lines, that the action is clear, and that the two characters are fairly well drawn. What do you think? With all

this background of understanding, can you now really enjoy the poem?" General murmurs of assent. "Would you pick up Browning and read him later for your own pleasure? Does he teach you anything? With this introduction, could you learn to understand other poems by him? Do you have any real feeling about him?"

These questions led to further discussion which helped students to voice and to understand their own judgments about the poem and its value for them. The teacher was quite willing that the opinions should differ, as long as they had been carefully examined.

After a brief lecture in ancient history, the teacher concluded with, "And thus Moses walked down Mount Sinai with the Ten Commandments." The class was to study important historical events of Hebrew history.

Barbie commented, "It's a nice story even if it is absurd."

"Tell us what you mean, Barbie," said the teacher. Barbie explained that all stories in the Bible are pure myth. The teacher then asked Barbie and the class to consider the story of Moses historically. Barbie understood then that complete rejection of the story cannot be reconciled with accepted findings of research.

In an advanced-mathematics class the teacher suggested that the class consider the "fact" that a straight line is the shortest distance between two points. By helping class members to study research from the works of leading mathematicians, he led them to realize that this simple statement may be questioned. At first the class refused to accept the new idea, but as it aroused new anxieties they were able to align it with their own scheme of thinking.

In classes in problems of democracy or history, where such topics as tolerance of other races and religions may be included, acceptance of new ideas by students may, of course, be slow or may not occur. Nevertheless, teachers must be ever alert to guide young people to think critically and deeply about the concepts from the lesson being studied.

Next, students must learn to help one another to ferret out new ways of tackling their problems. All possibilities need to be weighed and every suggestion given careful consideration. Creativeness will evolve slowly; new ideas will be forthcoming if everyone feels that whatever he suggests is worthy of consideration. As the student's need to impress others (particularly the teacher) diminishes with the discovery that every idea is weighed equally, that is, is welcomed as a

suggestion though not necessarily accepted, he begins to think critically.

Here the teacher must watch his own comments and even his facial expressions. We said that the talented teacher believes that, given opportunity, his students will be creative. He has faith that every individual can offer something, however insignificant. He tries not to declare, "No, that isn't right, John." If a student offers an erroneous statement, the teacher requests comments from other class members. Usually the students themselves will discover the truth. If they fail, the teacher asks, "Did you ever consider looking at the problem this way?" The teacher sets the example by demonstrating that he welcomes every suggestion. No one is criticized for any idea he expresses, for the teacher realizes that the individual contributes the best thought he holds at that moment. Here the stage is set for the real feelings of success, security, belonging, and love, because as young people feel their needs met by the teacher's interest, they in turn will offer these feelings to others besides those in their own subgroup.

The young person who says, "I have an A," or, "I got the right answer, didn't I?" or, "I finally finished the model—all that work for such a stupid thing," needs to be helped to realize that the thinking through is a matter of steps, each one important. Our culture stresses the final result. Many young people today "get there," paying very little attention to the necessary process. Added emphasis upon the process means careful consideration of the method of solving a mathematics problem, of finding something under a microscope, of reading a poem, or of weighing a dram of powder. It means time spent in considering the way to study translation in French or the culture of ancient Greece or town government; and it means use of means other than reading a textbook and memorizing meaningless information.

Through democratic cooperation in its various aspects, the teacher should gradually become attuned to the attitudes of his students. Sometimes group attitudes are obvious, as for instance, feelings of hostility against the leader or the topic, feelings of acquiescence with the teacher's desires, or real feelings of cooperation. These attitudes are important because the teacher wishes to form coalescence of critical thinking with needs, and problem solving cannot take place unless the student feels both ready and free to formulate his problem.

The method of the talented teacher, then, is to bring about critical thinking through coalescence of subject matter with student needs, and to accomplish this result in a democratic atmosphere. In lieu of discussing methods of teaching critical thinking, we have considered only *a* method. We have been so bold as to state that there is only one method. But real problem solving is always a personal matter, even though the group may agree upon a given problem to be solved. The teacher discovers, also, in employing the various kinds of cooperation, that he is attuned to the attitudes of most of the individuals in the group. If Brian hates mathematics, and Sarah loves equations but does not like problems, and Todd cannot understand what is being taught, but Rusty and Marilyn and Patty are ready to solve a problem about distance rate time, the teacher who respects individuals and attempts to teach them through cooperation makes use of every one of these attitudes as he helps each student to solve his own problems. More detailed discussion of this matter will be found in the chapter on intensifying student learning.

If the reader does not agree with our suggestions, we refer him to Dewey and his followers for stronger emphasis on student needs, to Breed and Hutchins for stronger emphasis on content. Both of these "schools" imply the atmosphere to be expected in the classroom.

LEARNING MATERIALS

Some Cases

1. The teacher said, "I'm interested in my students. I believe one should meet their needs, but how do I know what their needs are? Besides, my *first* job is to teach chemistry." Could understanding of coalescence help her?

2. Bob said, "The teacher was trying to copy out of the book onto the blackboard and the book kept shutting. I was smiling. She told me to quit smirking, and I couldn't help laughing."

The teacher said that it was his job to teach algebra and that Bob must stay out of his class as a disrupting influence. Why is cooperation lacking?

3. The teachers talked of baby-sitting with a group of bandits, of giving tests because "you can't trust them to do anything" else, of keeping order in the classroom, and of giving students grammar "to take it or leave it." Why do these teachers not respect the students?

4. In a class in social studies, Jayne said, "This completes our presentation on whether or not Russia had a right to blockade Berlin. Are there any further comments from the class?"

Bob said, "Jayne, you and your group did a fine job from the free coun-

tries' point of view, but how would things have been if you had argued on the Russian side?"

MARY: I agree with Bob. I also feel your discussion was one-sided.

TEACHER: Perhaps we can spend the rest of the period looking at this problem if you all think it is important.

Wherein does this class work in a democratic atmosphere?

5. Rory told the teacher after class, "Yes, my grade is important. This school emphasizes grades. That's all that matters around here. They don't much care how you get them either." Is it up to this student or to the teacher to emphasize the process?

Some Controversial Thoughts

1. The planners of the St. John's College program, following Robert Hutchins, "wanted to discipline young men's minds in reading, writing, and reasoning."¹⁶ The *subject-matter* view.

2. "The only justification for retaining any given portion of content is that it may serve some need or interest of the pupil."¹⁷ The *needs* view.

3. "The New Education stakes everything on the wisdom or the limitations of the teacher, while encouraging him to throw out most of the accumulated wisdom of the race."¹⁸

4. "Almost all groups are, at least in part, attractive because people have needs that can be satisfied only by personal relationships with other people."¹⁹

5. Recent studies show that effective leadership depends less on personality than on "the working relationships of an individual within a group" where he gains status through "active participation" and helping the group carry out its work.²⁰

6. "The atmosphere which prevails will depend primarily upon what the teacher does and how he does it."²¹

7. Different consequences result "if teachers accept students as they are, allow them to express their feelings and attitudes freely without condemna-

¹⁶ Milton S. Mayer, "Socrates Crosses the Delaware," *Harper's Magazine*, vol. 179, pp. 64-75, June, 1939.

¹⁷ J. G. Umstatt, *Secondary School Teaching*, Ginn & Company, Boston, 1953, p. 68.

¹⁸ Albert Lynd, *Quackery in the Public Schools*, Little, Brown & Company and the Atlantic Monthly Press, Boston, 1953, p. 69.

¹⁹ Leon Festinger, "Group Attraction and Membership," in Dorwin Cartwright and Alvin Zander (eds.), *Group Dynamics, Research and Theory*, Row, Peterson & Company, Evanston, Ill., 1953, p. 93.

²⁰ Margaret E. Bennett, *Guidance in Groups*, McGraw-Hill Book Company, Inc., New York, 1955, p. 101.

²¹ Rogers, *op. cit.*, p. 396.

tion or judgment, plan learning activities *with* them rather than *for* them, create a classroom atmosphere relatively free from emotional strains."²²

Suggestions for Further Reading

1. Benne, Kenneth D., and others: *Group Dynamics and Social Action*, Anti-Defamation League of B'Nai B'rith, New York, 1950. A kind of case study of a group in action.

2. Burton, William H.: *The Guidance of Learning Activities*, Appleton-Century-Crofts, Inc., New York, 1952. Chapter 10, "The Teacher is a Member of A Group of Learners."

3. Cantor, Nathaniel: *The Teaching-Learning Process*, The Dryden Press, Inc., New York, 1953. Chapter 4, "The Classroom Atmosphere."

4. Hall, D. M.: *The Dynamics of Discussion*, The Interstate, Printers and Publishers, Danville, Ill., 1950. A paperback with many suggestions for discussion outlined.

5. Lewin, Kurt: *Resolving Social Conflicts*, Harper & Brothers, New York, 1948. A series of papers on group dynamics.

²² Paul E. Eiserer, *Growing Points in Educational Research*, Official Report, American Educational Research Association, Washington, 1941, pp. 32-39.



5

Intensifying Student Learning

Intensifying the method of the talented teacher implies development, improvement, cultivation. In the classroom, intensifying assumes two forms: motivation and a broad approach. Through these two kinds of intensification student experience is enriched and made more penetrating, so that thinking and judgment occur for more students more of the time.

Motivation

After the child is led to the classroom with its modern facilities for study, can anyone make him learn? Perhaps if one holds the child's head in the book long enough, he may be coerced into reading something, though he may understand very little of it. But the talented teacher is able to lead the student to the fountain of knowledge and to

make him *want* to learn, deeply and thoroughly. It is when he feels the desire that a young person is motivated. True motivation is not a matter of "gimmicks" or trick incentives like finding a flower in the bottom of his dish if baby eats all his cereal. With a child confronting cereal such a "gimmick" may be effective for a time, especially since mother is fairly certain that most of the vitamins will get to baby's tummy. Using trick incentives for learning guarantees only that the student cares for the incentive, not at all that he learns in achieving his incentive. Rousseau believed that the true motive for learning is twofold—the desire to know and the usefulness of the knowledge. Modern writers have no conflict with Rousseau. Garrison and Gray say, "Motives are conditions within the organism which initiate activity in connection with some goal."¹ Thus anxiety is the inner (intrinsic) motivation for learning. A student feels motivation when he feels a need to find out something. Of course people act in many ways and are often unaware of the motive in action. Habit behavior—the kind we use in our many acts of daily living—would be one example of such unconscious motivation. Motives for critical thinking, however, must be conscious.

Contrary to the popular use of the term, a teacher creates no motives. He awakens students to the motives that they already possess.² On the other hand, because a child is led to the fountain of knowledge, the teacher need not expect that he will want to drink. Teachers must create conditions which will stir up anxiety in students. We have given many descriptions of ways to disturb their quiescence. It is necessary only to point out that problem solving itself is a condition which causes motivation. As a student finds success (discovers hypotheses and judgments in relation to his felt problems) through problem solving, he feels motivated to attack other problems through the same approach.

Incentives. Since the teacher does not create motivation, the use of inducements (extrinsic motives) to stimulate learning becomes suspect. Rewards, particularly grades, have long been considered incentives to learning. But most psychologists emphasize the value of inner motivation³ and question the value of teacher-established or institution-

¹ Karl C. Garrison and J. Stanley Gray, *Educational Psychology*, Appleton-Century-Crofts, Inc., New York, 1955, p. 251.

² Henry P. Smith, *Psychology in Teaching*, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1954, p. 206.

³ Garrison and Gray, *op. cit.*, p. 253.

established incentives. In other words, Betsy is probably not motivated to learn because there may be an A on her report card or because she may have time to study at the end of the class period. She is motivated to earn the A or the free time. What she learns may be simply, "I know now what the teacher wants, so I can get an A," or, "I know now how to get through my work quickly so I can have time to study." The motivation being for the incentive, Betsy learns how to achieve the incentive, but does not necessarily learn what she studies. There are some occasions, wholly unpredictable, when Betsy might become intrinsically motivated because of an extrinsic incentive. For example, she might find that she likes grammar after she has once plunged into the study of verbs, although she may not have seen a need at first. The external incentive has, in other words, aided Betsy in defining a difficulty. But the teacher cannot be sure when this will happen or if it will happen at all.

The use of incentives has a further limitation. The emphasis lies clearly upon the "end-result." We have suggested that the teacher's aim for problem solving and judgment evolves partly through emphasis upon the process of learning, upon all of the steps of critical thinking. Establishing incentives implies to the student, "Get to this end-result incentive! Get an A! The way is not so important as the goal."

Praise and blame are sometimes considered incentives. Although research has reached no definite conclusion in the matter, except to say that generally the incentive of praise is superior to reproof under normal conditions,⁴ it is often likely that the teacher's criticism works outside the atmosphere of mutual respect, which ordinarily promotes thinking by the individual himself. The teacher, when he says, "Bob, you did a fine job," may hurt not only the other students who are less gifted but also Bob himself, as much as when he says to Carol, "That was a pretty sloppy piece of work." For the teacher assumes the right to decide good and bad, poor and well done. If he can ask for the student's own evaluation and help him say for himself, "This is pretty good," or "This isn't half as good as I could make it," he is fulfilling his own aim of promoting thinking in the student. This does not mean that the teacher never offers his estimate, only that his estimate cannot be depended upon as an incentive. Curiosity is sometimes thought

⁴ Ernest R. Hilgard, *Theories of Learning*, 2d ed., Appleton-Century-Crofts, Inc., New York, 1956, p. 486.

to be a valuable incentive. But, as Comenius said, learning is induced through the inner desires, interests, and curiosity of the pupil. Curiosity is only that point where anxiety occurs in the student so that he is motivated to discover an answer. It is the point where the ideas and suggestions which he is offered make him aware that he needs to know something. The teacher need not resort to incentives of questionable merit.

Goals, Beliefs, Ideals. The second road to motivation is the examination of goals and values in an effort to arouse anxiety and lead students to form judgments. Youngsters should be encouraged to set goals,⁵ say the psychologists. Kingsley points out that when one's goal is broad enough to cause a variety of activities it becomes an ideal.⁶ The statement that the teacher must aid students to establish goals and ideals is worth making only if the ways for setting goals are defined clearly and carefully.

Martha had an average IQ. She came from a wealthy family, who hired a tutor for her during high school. Martha's tutor said, "The girl is very slow. If you explain many times she begins to understand. But she plugs. My, how she works!" Martha knew that she was expected to go to college, and go to college she did. The effort was painful, but her goal was set.

Bruce had a very high IQ. He learned very little in school. He told the teacher, "What I really want to do is to go to South America and get lost among the primitive people somewhere. I'm too stupid to do anything else." His goal and his sights were set on a low plane.

Janet, from uneducated parents, determined to be the first one in her family to graduate from high school. Jesse, from uneducated parents, could hardly wait to reach the age for leaving school. The goals and ideals of the youngster who determines to be a surgeon affect him just as do those of the person who wants to leave school as quickly as possible. Although psychological research emphasizes the importance of setting goals and finding ideals, such objectives are thought to be out of fashion. The oldsters feel that the adolescent's goal today is security. Perhaps his clinging to security is the fault of these same oldsters, who have provided little opportunity for the adolescent

⁵ Garrison and Gray, *op. cit.*, p. 272.

⁶ Howard L. Kingsley, *The Nature and Conditions of Learning*, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1946, p. 85.

to examine his goals and to consider the consequences of those he chooses. He has never been forced to consider his ideals, to discard some and add to others. This step follows after he really examines the beliefs he holds and understands how they motivate him.

Adolescents are confused about their goals. They say, perhaps, that they want to serve their fellow men or to attain the greatest good for the greatest number, but they are blind to the fact that in their actions they prove that they really desire something quite different. Marilyn says, "I want to be nice to everyone. I have a friend who isn't attractive to boys, and so I left her alone when I got to the dance." Marilyn fails to recognize that her statements contradict each other. Establishing goals presupposes understanding of what one values here and now, as proved not by assertions but by actions. The step of making judgments should offer the necessary background for a careful consideration of goals. When the student awakens to the real values upon which he acts, not those to which he gives lip service in fine-sounding words, he then may begin to examine his goals in a realistic manner. Sometimes people ask why so many students intend to serve their fellow men and so few carry out the intention after school years. Such students have failed to consider, in the light of their actions, the true meaning of what they *said* was their goal.

It is at step 1 of problem solving, and at the forming of judgments, that the talented teacher considers how to establish goals for each student. When awakening anxiety the teacher helps the student to consider his real reasons for caring about the study of a new area of learning. In other words, as the teacher looks toward the kind of problem to be defined, he asks the student to name both his immediate and long-term goals in relation to the area to be studied. In helping the student to appraise his learning and formulate judgments, the teacher raises the same questions again. The boy looks backward to the goals he had defined at step 1, and ahead to the goals he has set up for his future life.

A class in United States history, which had been studying the newest states in the Union and the ways they gained admittance, raised a question about Puerto Rico. Immediately, as one means of producing anxiety in a large number of students, the teacher said, "What does the study of Puerto Rico have to do with you? Why do you care about this part of the world? What has it to do with your ideals for doing what is

right and acting in an acceptable way?" [*Need for love, belonging, and the integrated self in social, civic, and moral areas.*] The replies of the students were general—that every citizen should know about this island which might become a state, and that they believed one should help other people. Next they defined their problem—"Should Puerto Rico be encouraged to become a state?"

It might appear that the question of the admittance of an area to the United States fails to relate to the lives of adolescents. Yet the teacher was able to help them to see that young Americans were not isolated from Puerto Rico and that they needed to know something about it. Then, through the various steps of thinking, the students considered the products and size of the area. A good map of Puerto Rico, superimposed on a map of the United States, showed that Puerto Rico is slightly larger than Delaware but only one-third the size of Vermont. At step 4 each student formed a tentative conclusion—that Puerto Rico should or should not become a state. When Mr. S moved the class into the final steps, he said, "Now at this point in solving our problem we turn to consider what we have learned and how this new information relates to other things we know and believe. We need to judge what effect our conclusions have on our lives, how these conclusions tie in with our ideas for the future, with our goals and ideals."

If this is an early experience with critical thinking, the teacher might continue, "It may seem that our conclusions have little relation to any of these things. Yet if they do not mean something personal in our lives now and in the future, we might as well not bother to find answers to our problems. What have some of you to say about this? Is the question related to other things we know? Would the answer have an effect on our lives now and in the future?"

WARREN: I think the feelings of the people of Puerto Rico need to be compared with those of the people of Oklahoma and of Alaska and Hawaii, which we have just been studying. They must be about the same, and feelings of people are pretty important.

BARNEY: Even if we have decided what we think ought to be done with the area, we need to consider what we here can do about it, if anything.

DORIE: We know the kinds of legislation that are necessary. All we can do is write to our congressmen when we reach voting age.

ERNIE: I'm not sure that isn't just an easy answer. There must be other things citizens can do. You could start some kind of campaign, I should think, and get people excited about Puerto Rico.

BOB: You would have to be able to show citizens reasons why admitting this area would be of advantage to them, not just to Puerto Rico.

MR. S: Do you believe that people ought to campaign and fight for issues? [*Emphasis on values and goals.*]

BOB: Absolutely. They have to. If they don't, everything will go to pot, and it will be their fault.

MR. S: Does this mean that everyone has an obligation to get into politics? [*Emphasis on values and relation to action.*]

CAROL: Not as politicians, but as citizens they do.

FRAN: I see what Mr. S means. He asked us to wonder about how our conclusions affect our goals and ideals. I guess we all want to be contributing citizens, and that means that we have to put ourselves out to do some of the things we have been talking about.

We note here the astute questions of the teacher. They were asked in a general way, directed to no one in particular, their purpose being to focus thinking upon values and goals. Taking his cue from the remarks made by the students, the teacher rephrased their words again and again in terms of values and goals and of their relationship to action.

In the manner described here the talented teacher assists students to ponder, in realistic terms, their purposes and their levels of aspiration. If Jim had said, in reply to the teacher's question, "I believe in people campaigning and fighting for issues," but if later he had altered his original conclusion that Puerto Rico should not become a state because most of the class disagreed, then the difference between his behavior and his assertion of belief would require further reflection.

The teacher might say, "Jim, I wonder what this statement really means to you. It is easy for all of us to say we believe in something, but it isn't always easy for us to act according to what we say. We need to judge what we truly believe by looking at the way we behave. Do you remember your reversal of your original stand about Puerto Rico, Jim? Do you think that you would really stand up for an issue?"

Helping students to reflect upon goals and values requires attention to each student's remarks and actions. The burden lies with the talented teacher to listen to his students' statements of belief and to observe

the things they do which belie their asserted motives, and finally to note for them, in an objective manner, the contradictions. As the talented teacher tries to help clear thinking by stimulating anxiety and encouraging the forming of judgments, he will discover whether students are thinking clearly about their own hypotheses and judgments. As he becomes more aware of the individual motives of his students for their present and future decisions, he may take advantage of situations, like that with Jim, which offer an opportunity for reconsidering motives and goals.

The relationship between motives and goals, then, is obvious. Goals, beliefs, ideals broaden the possibilities for arousing anxieties and for aiding students to make critical judgments. The student who knows already that he ought to fight for issues which he believes in, or who awakens to this concept as a result of thinking, possesses a new awareness of an area of living where he may meet his needs. The next time an idea is expressed or an issue is raised which bears relation to it, he will perceive his own need to find solutions to new problems. Ideas about fighting for one's beliefs will not, then, remain meaningless to him, as were Articles 2 and 3 of the Bill of Rights to Jane in her study of the Constitution, but will hold significance and will become a challenge as did Article 1 for Jane.

If adolescents are made aware of the motivation within them, they will want to solve problems in a given unit of study because the answers they find may also be answers to some of life's problems. The teacher sets the stage by pointing out as many ways as he can discover in which the study will offer such answers. Examining with students their beliefs, goals, and ideals at step 1, and again in forming judgments, paves the way to new anxieties, new desires to learn, until they may become students who love learning. The process is cumulative. Real motivation has so stimulated and intensified learning in the present that it will continue into the future.

"No man can reveal to you aught but that which already lies half asleep in the dawning of your knowledge. . . . If he is indeed wise he does not bid you enter the house of his wisdom, but rather leads you to the threshold of your own mind."⁷

⁷ Reprinted from *The Prophet* by Kahlil Gibran with permission of the publisher, Alfred A. Knopf, Inc. Copyright 1923 by Kahlil Gibran; renewal copyright 1951 by Administrators C.T.A. of Kahlil Gibran Estate, and Mary G. Gibran, p. 64.

The Broad Approach

To help a student to feel motivation, the teacher must know his qualities as an individual and offer challenge and help to him according to his background and to what he needs in order to learn. This is the meaning of the broad approach, which intensifies student learning.

The talented teacher faces a new class for only a short time before he is very much aware of the diversity among his students, their range of abilities, range of achievement, range of interest and of special gifts, and range of socioeconomic background. Not only must these be considered; they must be capitalized upon, if the teacher is to aid each student to move forward in thinking and learning. So much is obvious. At present a movement is under way to challenge the bright and gifted. It appears almost a new movement until we recall the one-room schoolhouse where Marie, advanced in reading, read with the fourth grade when she was only six; where Jimmy, who loved mathematics, was given special problems to work for fun; and where all advanced students helped the less advanced for the good of everyone. It is this sort of teaching which may today be called a broad approach. It means that the teacher stretches a problem like an elastic band, the slow students covering the fringes of a problem area, the average covering more, and the superior taking the whole continuum.

The differences among students lie not only in IQs, which may vary in an average high school class from slightly under 90 to 140 or 150; in a junior high school class from 75 to 140 or 150. Some classes are composed of students with IQs ranging from 60 to 160, with several mentally retarded youngsters at one extreme and some gifted ones at the other.⁸ This condition, of course, is undesirable, and it is to be hoped that administrative grouping into more homogeneous classes will occur. Such a change would be in accord with the findings of Conant, who says there should be administrative ability groupings, subject by subject.⁹ The differences extend also to achievement, which may vary in a given secondary school group from fourth-grade achievement to that of the average senior in college. Range in mental age might be from six

⁸ Henry B. McDaniel, *Guidance in the Modern School*, The Dryden Press, Inc., New York, 1956, p. 4.

⁹ James B. Conant, "Some Problems of the American High School," *Phi Delta Kappan*, vol. 40, pp. 50-55, November, 1958.

to eight years at each grade level in high school.¹⁰ Interest, special abilities, maturity, experiences, socioeconomic background are areas of further differences.

The bright child is generally superior in vocabulary, generalizations, abstract thinking, insight, reasoning, speed, persistence, memory, foresight, humor, range of interests, initiative, and judgment.¹¹ With so many superiorities, the gifted must be offered new challenges and vital problems in a situation in which to solve them.¹² Because they are more able to work alone, however, the talented teacher supervises them no less. He realizes that their abilities must be developed for the sake of the contributions which they alone will later make to society; and for this reason, as well as because he believes that every individual has equal right to his attention and help, the teacher offers the bright and gifted equal supervision and aid.

The slow learner at the junior high and high school level is less easily described. At these levels the very slow pupils have usually been moved either to special classes or to classes designated "slow group." Thus the general experience of the teacher at these levels with a regular class is to find only a few students below low-average (about IQ 90). The slowest students in a class have a greater need for direction, for examples and illustrations making learning concrete, for repetition, for short-term problems, the results of which come quickly.¹³ They require careful, detailed explanations in a simple vocabulary and in concrete terms, specific applications to their present or future, specific tasks which mean something to them.

There never was and never will be an average child. There are only the boys and girls who fall somewhere between the gifted and the slow at many points along the line. It is true that more of them are near the middle of the line, but the talented teacher teaches each youngster, and the fact that more of these youngsters have middle ability in no way affects his desire to teach each one what is necessary

¹⁰ Leo J. Brueckner and Guy L. Bond, *The Diagnosis and Treatment of Learning Difficulties*, Appleton-Century-Crofts, Inc., New York, 1955, p. 22.

¹¹ Norma E. Cutts and Nicholas Moseley, *Teaching the Bright and Gifted*, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1957, pp. 18-26.

¹² Arch O. Heck, *The Education of Exceptional Children*, McGraw-Hill Book Company, Inc., New York, 1953, p. 393.

¹³ Harold W. Bernard, *Psychology of Learning and Teaching*, McGraw-Hill Book Company, Inc., New York, 1954, pp. 217-218.

to him, that is, to help him solve problems which he perceives and which are therefore of value to him.

Teacher Role in the Broad Approach. We have already discussed ways in which the teacher may come to know his students. But the teacher cannot see all and hear all; time and opportunity limit him. To expect that he will always know certainly about ability, achievement, interests, special gifts such as musical talent, and background, is to expect the teacher to work miracles. He will discover quickly that two or three students are bright or gifted, and that two or three others are the slowest in the group; but he may not realize that quiet Alfred is extremely gifted though he often fails to cooperate, or that tireless Gerry is really slow. The teacher may be aware that extrovert Barry is an amateur ventriloquist, but not that Johnny has quietly built a complete ham set.

Because he recognizes these vast differences, the talented teacher, we have said, accepts the fact that the final judgment which each individual makes is personal, cannot be predetermined, and differs from other students' conclusions and perhaps also from the teacher's. The teacher never expects that a problem chosen by the class will result in identical conclusions or identical learning, in either quality or quantity. The depth of the learning by gifted Mary, as well as the amount of material studied, will be far greater than either the depth or the amount covered by slow Sally. The teacher attempts to urge to deeper study those whom he considers bright, to find easier paths to problem solving for those who are slow, to provide just enough challenge for the average. But because he knows his judgment may be faulty, he urges that every student do his best, work as hard as he can, and think as deeply as his capacity will allow.

The major role of the teacher, then, is not to predecide the depth and amount of information and ideas each student ought to cover. His first duty is to help each student to become aware of his anxiety in relation to whatever topic is under consideration. Enough opportunity for anxiety should be offered so that some areas will appeal to the slow, some to the middle group, and some to the gifted, so that diversity of interests will be considered, special gifts used, and different socioeconomic backgrounds appealed to. His second role is to provide material for solving problems which seems to suit the student's ability, interest, and background.

A class in sociology in a modern high school was to study population problems in society. The teacher introduced the topic by describing parts of India where the population (which he defined) expands rapidly and where each father subdivides his land among his sons so that many areas have become so small as to be almost nonexistent.

"Does population growth affect you, I wonder?" he said. "Some of you are hoping to go to college next year, and the number of children born during your birth year will affect your chances. [Need for *success*.] The same is true with those of you who hope to become apprentices in a trade or to secure a good job next year. An article I read recently said that in the future a child will have to play on one small cement square; he will have to live on about half the food he has today; and houses will have to be larger by two or three rooms to accommodate grandparents and great-grandparents. I hope we don't live to see that day, but maybe some of you will. [Need for *love, varied experiences, physical comfort*.] Perhaps you might consider your own family and the number of children in it, in comparison with the average American family, and then with the average Chinese or Japanese family, in which hordes of relations constitute a big problem. Did you know that people with little education tend to have large families? Perhaps you wonder what can be done to ease the problem of too many people for the amount of land and the amount of food to eat. Perhaps you wonder whether the problem will affect you in the future. You may find that there will be so many people in the world that you will have to do what someone tells you, just to keep out of other people's way. [Need for *integrating self, being like peers, accepting a new self*.] You won't be able to decide what you want then. [Need for *independence*.] Let's hear some of your ideas about population, what you have read or heard, and then we can move on to define the ideas we wish to cover."

Here the teacher has presented a number of possible thoughts which may start anxiety and appeal to needs in the areas of health, vocation, economics, social relations, home, and at different socioeconomic levels. The slow learner may feel a need at the thought of next year's job and of the number of children in his own family. These are good bases for comparison—ordinary, concrete matters, easily grasped. The brilliant, while gaining some interest at every point, may seize upon the suggestion that something can be done to ease the problem. The others

will vary from the simplest, most personal need to the total, universal need, or they will find needs at every point. The opportunity for anxiety has been broad enough to start thinking. With further discussion new anxieties should be aroused. It is at this point that the class members should move to step 2 to define the problem or problems and suggest ways to solve them.

Let us suppose that at step 2 the whole class decides upon a two-pronged problem, "What is the meaning of the population problem and what can be done to solve it, particularly by us?" It has been agreed that the first part of the problem must be answered first, and that each student, using the class library, will do his own research in an attempt to find answers. The slow learner gains perhaps only one idea—that people with little education tend to have large families. He may say, "My family hasn't much education, and they have nine children."

The teacher helps Donald to define a problem in relation to his idea. "I wonder," he says, "why having an education makes you have small families." For him the teacher points out one or two sources of information, which present facts and attitudes about this question in a relatively simple way.

The gifted student becomes excited about religious implications, the effect of advanced technology in producing more food from less space, the effect of an elderly society upon the life of a community and upon the individuals within it. He wants to study all these problems. The teacher suggests that he define one problem at a time and study that as thoroughly as he wants to, taking others if he finds time; the teacher offers to the student a large number of sources, some of them difficult to read.

A student in the middle says, "You said the population problem in the United States is different from that in other parts of the world. I'd like to find out if there is any real problem in this country."

Thus, from the large problem which grew out of many possible felt needs, students find they define various subproblems. The slow learner attempts a small problem, the gifted, several with broad implications. All remain on the broad approach in that they attack one general problem.

It may be that one of the average students might help Donald, the slow learner, to study his problem, or one of the gifted help one less able. This kind of teaching will be improved, also, if small groups are

used, one or two bright students helping several slower ones. The brighter students acquire a sense of cooperation and also learn to think more clearly as they try to offer simple explanations to others.

There will be times, of course, when brilliant students choose a too easy problem and the slow a too difficult one. With the latter, the teacher usually need only say, "Let's narrow this down to a smaller problem that you can really cover." To the brilliant student who feels little desire to solve the problems proposed, the teacher might say, "Are there other areas that interest you more? Do you think you can cover more than this one question?" Apparently, gifted students are not apt to choose the easy way. Studies of hundreds of high school students by Conant and others show that able students choose difficult and advanced courses in preference to something easier.¹⁴ If the material meets a boy's needs he is unlikely to refuse to respond.

The broad approach uses interests and special abilities as well as general ability. The teacher helps those with special interests or abilities to apply them wherever they fit the lesson. In the study of population, for example, one student, extremely gifted in mathematics, offered to present Malthus's theory of population and to explain the mathematics involved. Such proposals may come directly from the student. Where the teacher is aware of a special interest or ability, he may request that the student use it as an aid in solving a problem.

The socioeconomic background of each student is another matter which the teacher must consider if he is to arouse anxiety in as many students as possible. "The lion's share of our time and energy is spent in responding to the calls of our groups," and, "each of our responses is definitely patterned by the relevant group. Each group . . . prescribes in detail the qualitative pattern of complying action."¹⁵ Thus the teacher who is aware of the kinds of groups to which the individual belongs, and of his general socioeconomic background, can help him to define problems which will be consistent with this background. We note that Donald is a slow learner from a lower socioeconomic group. His interests are in relation not only to his ability but to what he has learned about everyday living from his family and the groups of which

¹⁴ Alice Miles Eagle and H. Robert Kinker, "Do Intellectually Superior Students Take Soft Courses," *Phi Delta Kappan*, vol. 39, pp. 402-404, June, 1958.

¹⁵ Pitirim A. Sorokin, *Society, Culture and Personality*, Harper & Brothers, New York, 1947, p. 350.

he is a member—broad groups, such as church, political organizations, occupational circles, as well as smaller groups, such as family and neighborhood. His problem, as he conceived it, related directly to his background.

Havighurst has defined some of the developmental tasks in relation to three levels of socioeconomic background. He found that the achievement of emotional and economic independence is most difficult with the middle group. Civic competence, he found, has its greatest pull for the upper class. In acquiring values, only the lower class ignores scientific views. In the area of more mature relations with peers, Havighurst found that the middle group has a well-developed social life with great emphasis upon adjustment, that the upper group is similar in tastes and proclivities, but that the lower group is interested in social experimentation, sex experience, and early marriage.¹⁰

With the findings of the sociologists as an aid, the teacher may enrich student experience by appealing to the interests of the individuals in his class. In a rather heterogeneous class, as far as socioeconomic status is concerned, the teacher who is aware of the general background of each student will help to point up interests which these groups usually feel. For example, in the population problem the teacher, aware that civic competence might constitute motivation for the upper groups, did not make the mistake of expecting it to motivate students like Donald from the lower group, for whom civic competence is not likely to be important. At the same time, the teacher is careful not to generalize or to decide beforehand that he knows the interest or lack of interest of lower-class students. He merely broadens his approach because he is aware of the various backgrounds which may have formed the values of the individuals in his class.

Teacher Role with the Unresponsive. Some students, in spite of the fact that the talented teacher forms a coalescence of student needs with subject matter, will not be touched. That is, the teacher fails to discover the areas of living which meet the needs of some adolescents. The talented teacher must search constantly for new ways to stimulate anxiety, must indeed never cease to try to reach such students. Sometimes a moment of illumination will light the path for the student from that time onward; but always some failures will remain. If he never gives up, the teacher has fulfilled all the expectations of his superiors

¹⁰ Robert J. Havighurst, *Human Development and Education*, Longmans, Green & Co., Inc., New York, 1953, pp. 111-158.

and of his own conscience. He cannot allow the fact of a few failures to cause him undue discouragement; somehow he must accept the inevitable.

Defining failure is not simple. Burton says, "The majority of monographs, articles, and discussions concerning pupil failure are shockingly superficial."¹⁷ The teacher must adjudge failure, not in terms of superficialities such as grades, but in terms of his own aim for critical thinking. To do so is, of course, not so easy as to judge by grades alone. But the student who fails to feel interest, who never defines his own problems and at best adopts another student's problem, who fails to name his own hypotheses and estimate their place in other learning, who refuses to make judgments—the student, in other words, who remains apathetic, unoriginal, unwilling—may be termed a failure.

The reasons that Bob or Elsie or Jamie are failures are all one and the same: these students are bothered by something which interferes with their ability to find interests where normal adolescents find them. Interference may stem from a number of causes. Bob lacks enough ability to engage in problem solving in junior geometry. Elsie, although she has the innate ability, lacks an achievement level which would enable her to perform adequately; that is, her basic arithmetic background is so poor as to hinder her in the class. Jamie lacks in achievement also, but his difficulty lies with ability to read, so that geometry theorems are incomprehensible to him. Other students also are failures. Barry has very poor eyesight, improperly diagnosed, which causes difficulties. There are the emotional strains caused by poor social adjustment, difficulties at home, or any other of life's hard problems. Not one of these students can help being a failure; none of them fail because they wish to fail. Only Bob cannot be aided to achieve in the geometry class; his course of study needs alteration. The others will overcome failure only if someone helps them to remove the interference which causes it.

That someone will sometimes be the teacher alone. However, as Hansen says, "You should enlist the assistance of whatever specialized school personnel may be available to you."¹⁸ Diagnosing failure and working with it is a function of the guidance department. Ideally, the

¹⁷ William H. Burton, *The Guidance of Learning Activities*, 2d ed., Appleton-Century-Crofts, Inc., New York, 1952, p. 622.

¹⁸ Kenneth H. Hansen, *High School Teaching*, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1957, p. 288.

teacher should request that a guidance worker assist him to discover why Bob or Elsie or Barry is failing. Then, with the help also of remedial teachers, who should be able to aid under-achievers, the teacher might work with those of his pupils who may be helped—Elsie, for instance, with simple mathematics, Jamie with reading theorems. The teacher might also offer additional support, or follow other suggestions of the guidance workers for pupils with emotional disturbances.

It is a rather sad commentary that, as Burton reports, teachers list among causes of failure, indifference, antagonism, failure to persist, noncooperation, laziness.¹⁹ None of these attitudes is a cause of anything; the items are merely a list of teacher judgments passed upon the students without a second glance at basic causes. As Rogers says, "*The best vantage point for understanding behavior is from the internal frame of reference of the individual himself.*"²⁰ No one feels indifferent or antagonistic or lazy. Students may wear such a façade to hide their unsatisfied needs. But the talented teacher does not even think in such terms; he thinks only of how the student feels. Bob feels completely lost because he lacks the ability to do the work. Elsie feels lost and inadequate because she cannot perform basic arithmetic functions and Jamie because he cannot read. Barry feels that he is stupid only because his eyesight needs correction. Joan feels so completely misplaced, because of her lack of social adjustment, that she cannot think beyond her mixed-up world. Knowing, then, why a student fails, the teacher thinks in terms of his feelings. With this beginning he is often able to discover how to awaken interest in the students who have difficulties. With Joan he emphasizes social adjustment, mentioning areas where, because of her great need, she should find healthy anxiety.

Barry, of course, needs medical attention, a matter which is outside the teacher's realm. So, too, is the adjustment of Bob's course of study. Elsie and Jamie need special remedial work. If there are no guidance or remedial facilities, then the conscientious teacher must assume responsibility for diagnosing difficulties as well as for remedying them. Good intelligence and achievement tests, plus diagnostic-reading and mathematics tests, will aid in determining both intelligence and achieve-

¹⁹ Burton, *op. cit.*, p. 637.

²⁰ Carl R. Rogers, *Client-centered Therapy*, Houghton Mifflin Company, Boston, 1951, p. 494.

ment levels. Adjustment problems are within the compass of the teacher's classroom only when they arise naturally; teachers are not trained counselors. The best thing to do, if there is no guidance department, is to get one.

Whenever the class or a small group of students or one student fails to feel interest and then fails to define a problem or really to agree to a class-defined problem, the teacher, before he can hope to alter the situation, stops to show the group or the student that he understands how they feel. No matter whether the cause is lack of ability, of interest, of achievement, whether it is poor adjustment or socioeconomic background, the teacher may use a general approach such as, "You think this material isn't very interesting? You don't care much about it?" If he refrains from becoming emotionally upset by lack of cooperation in his students and persists calmly with such an approach, he will often discover causes for his failure to stir up anxiety. Again he works through cooperation and employs any objective measures of appraisal which he has found useful, as means to understanding the feelings of the individuals in his class.

The broad approach, then, is not a strange, unworkable innovation. It was used in one form in granddad's little red schoolhouse. This approach promotes thinking by each individual while keeping the class generally on the same broad problem. It is also one answer to mediocrity, for here is no teaching directed toward the mythical middle, but a challenge for each student according to his ability and achievement.

* * *

The kind of motivation which aids students to realize their own felt needs, and the broad approach which neither sets arbitrary standards for a student's level of achievement nor forces an individual into an unfair comparison with each of his peers—these two together intensify the experience of students so that their thinking reaches deeper and creates lasting meaning for their lives. This sort of teaching is not easy. Yet the rewards of hard effort (as is true in anything worth doing) are so far-reaching and important to the student that the effort seems small in comparison.

We doubt that a good teacher can avoid these two important ways of leading students to deeper thinking. Probably any teacher would say that he employs motivation. But the form of motivation is too often in

terms of "If you don't do this, then this will happen." A few teachers claim to use the broad approach, but many others state frankly that they teach "to the average" because they have no time to do otherwise. Some claim use of a broad approach but really employ only one technic for all students, expecting the same results from all. If the reader claims to use the sort of motivation described here, with a broad approach which sets no arbitrary standards but simply helps each individual to set his own; if, making this assertion, he yet teaches to the average, using threats for motivation, we realize that he has not assimilated the thoughts here presented. He, like the students who have not yet learned to set realistic goals, will say that he believes an idea but will prove by his actions that in reality he believes something close to the opposite.

LEARNING MATERIALS

Some Cases

1. The department head watched the novice teacher and said later, "Your class was dead. You asked them questions from the book, and they answered if they could. You must motivate the students." Obviously, the supervisor meant, "You must find ways to arouse anxiety."

The teacher replied, "But I'm just teaching about weather and climate. Things like humid tropical climate, hot and arid climate are just factual. Either they know the answer, that the North Temperate Zone is between parallels $23\frac{1}{2}^{\circ}$ north and $66\frac{1}{2}^{\circ}$ north, and that the climate is not extreme, or they don't."

Where does this teacher miss completely the whole meaning of motivation, and how might the supervisor aid her?

2. The teachers asked questions to arouse anxiety in order to make students aware of inner motivation. The first teacher asked, "Who led the Rough Riders?" Then, "When did it happen?" His questions were "Who?" "When?" "What?"

The second teacher asked, "Why was Teddy Roosevelt chosen to lead, and do you think he was a good leader?" His questions were controversial, usually, "Why?" or "Do you think?" Why is the latter kind of question better calculated to arouse anxiety and to make students aware of inner motivation?

3. The student said, "The three causes of World War I were: the assassination of Ferdinand, heir to the Austrian throne; the Franco-Russian Alliance of 1894, which became the Triple Entente including England; and the Triple Alliance of Germany, Austria, and Italy."

The teacher said, "This student is really motivated; he always knows the answers."

Why is the teacher's definition of motivation questionable?

4. The slow learner, while studying the unit, communications, in business mathematics, considered how his family and friends used mail, phone, and means of travel; in calculating, he used the kinds of mathematics he needed. The quicker learner studied the mathematics involved in his town's need for communications. The brilliant student studied communications on a national scale, including the mathematics involved in charts and graphs. Assuming that each student found his place along the continuum from one group to another, how far do you think the teacher's comprehension of the broad approach goes?

5. The first student in Class A said, "I never finish all the reading the teacher gives. I don't understand *Silas Marner*."

The second student replied, "I read it much faster than she assigns it, but I don't let her know when I finish or she will give me more of the same stuff to read."

The first student in Class B said, "I love *Tom Sawyer*. I never knew a book could be better than a comic book. I'll read more when I finish."

The second student said, "When I finished *The House of the Seven Gables* the teacher let me read *The Peabody Sisters of Salem* and now I want to begin *The Scarlet Letter*."

How does the teacher in Class B manage a really workable broad approach as contrasted with the teacher of Class A?

Some Controversial Thoughts

1. "Motivation is more than an explosive force—like exploding powder in a cartridge—it is a propelling power—like gasoline in an automobile."²¹

2. "Much of human motivation, even though it stems from the so-called 'animal needs,' is influenced by human mores—by customs, traditions, or man-made laws."²²

3. "Much of our learning in everyday situations comes through our attempts to solve personal problems or gain understanding in areas where we have a deep interest to motivate us."²³

4. Frequently we have seen the teacher's function as prodding the slow students to keep them moving at the pace set by the class, and holding back the rapid learners to lessen the difference.²⁴

²¹ Bernard, *op. cit.*, p. 62.

²² Norman L. Munn, *Psychology: The Fundamentals of Human Adjustment*, Houghton Mifflin Company, Boston, 1956, p. 82.

²³ Floyd L. Ruch, *Psychology and Life*, Scott, Foresman and Company, Chicago, 1953, p. 277.

²⁴ Lindley J. Stiles and Mattie F. Dorsey, *Democratic Teaching in Secondary Schools*, J. B. Lippincott Company, Philadelphia, 1950, p. 137.

5. "The tendency of the American people is to idealize the average and to discriminate against the intellectually gifted by refusing to offer opportunities suitable for their needs and abilities."²⁵

6. "To do *more* problems in algebra . . . of the type a student has already mastered is *not* an enrichment experience."²⁶

7. "It is undoubtedly true that human abilities generally are governed by correlation instead of compensation."²⁷

Suggestions for Further Reading

1. Cutts, Norma E., and Nicholas Moseley: *Teaching the Bright and Gifted*, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1957. A book designed to give practical information to the classroom teacher.

2. Garrison, Karl C.: *The Psychology of Exceptional Children*, The Ronald Press Company, New York, 1950. Includes mentally slow and gifted with school provisions for them.

3. Kimble, Gregory A.: *Principles of General Psychology*, The Ronald Press Company, New York, 1956. Chapters 14 and 15, "The Primary Drives; Secondary Motivation."

4. Mort, Paul R., and William S. Vincent: *Modern Educational Practice*, McGraw-Hill Book Company, Inc., New York, 1950. Practice 3, "Pupil Interests"; Practice 17, "Enriched Teaching."

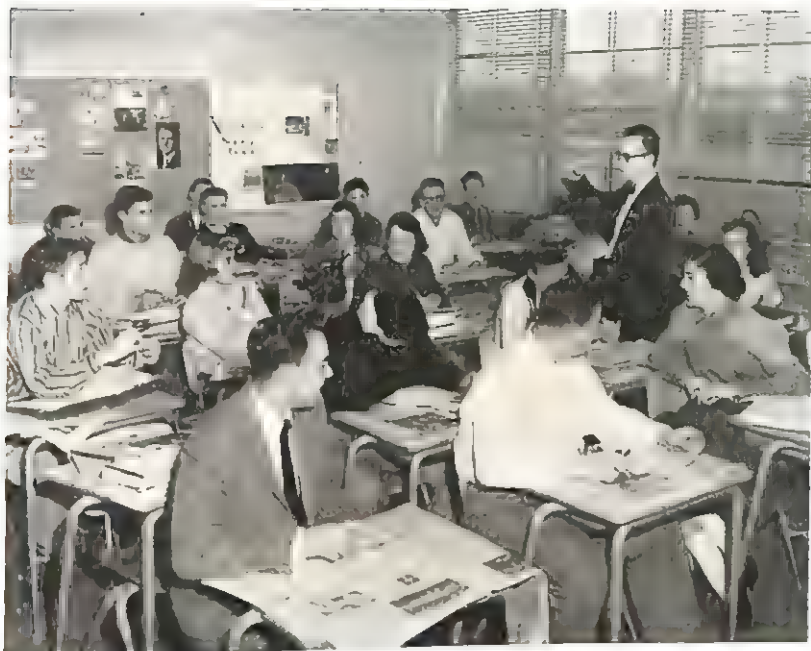
5. Stephens, J. M.: *Educational Psychology*, Henry Holt and Company, Inc., New York, 1951, Chapter 11, "Utilizing Motivation and Experience."

²⁵ Florence N. Brumbaugh, "Intellectually Gifted Children," in Merle E. Frampton and Elena D. Gall (eds.), *Special Education for the Exceptional*, vol. 3, Porter Sargent, Boston, 1956, p. 3.

²⁶ Marvin D. Alcorn and others, *Better Teaching in Secondary Schools*, Henry Holt and Company, Inc., New York, 1954, p. 234.

²⁷ Heck, *op. cit.*, p. 2.

PART THREE



6

The Discussion Technic

Teachers say that discussion is one of the most commonly employed technics of teaching. Many untrained teachers believe that there are two ways to teach, by lectures and by what they call discussion. However, the misapprehensions about the meaning of the term, the use of the technic, and its purpose are almost too numerous to mention. Three neighbors chatting over the back fence arrive at very different conclusions from those a class reaches in serious discussion. A series of brief dialogues, first between teacher and one student, then between teacher and another student, is not discussion. A meeting conducted according to Robert's *Rules of Order*, even though it permits an interchange of ideas, is not discussion. A group of friends who begin to discuss the value of their education may be talking several minutes later about how to hit a "curve ball."

A Description of the Technic

The discussion technic, properly used in the classroom, is unlike all of these. It is a part of the effort by the teacher to form a coalescence of student needs with teacher aim for thinking about subject matter. Thus discussion results from the attempt to arouse anxiety (step 1), to define a problem (step 2), to solve that problem once defined (steps 4 and 5), or to formulate judgments.

The second step in problem solving, defining the problem, is one of the places where discussion is essential. The results of this discussion must necessarily be agreement or consensus, perhaps the result of a majority vote, since the class will proceed to act upon their chosen problems. Discussion is used almost exclusively in defining problems because it alone, at this stage, promotes cooperation of teacher and students.

In a class in beginning French, the teacher had introduced the first unit on simple words and sentences by showing colored slides of France and telling a simple story in French. As he spoke, he supplied the English meanings of words when necessary. He then asked the class to think about what they needed to learn.

"Here is France," he said. "Many more of you will visit France in your lives than ever did so in all past generations. Of course you can go to France and stay in English-speaking hotels and visit museums with English-speaking guides, but I feel sorry for those who do. They don't learn about other peoples; they don't talk with them and understand them and feel with them. They learn nothing of the culture which has made the French people what they are. They don't gain any value for themselves in knowing others or offer value to others in knowing them."

Student comments followed.

Mr. G said, "Somehow we must find a problem or problems that we can work on together, and we shall need to agree so that we can proceed."

One student suggested, "Let's learn lists of words and then make up sentences from them."

Bob groaned, "Oh, no! That would be boring. I think we should take some things, like the things in this room, and ask the words for them. That way we should learn how to speak."

Janet said, "What is it we really want to know? Nouns and adjectives and verbs? Maybe we should study about them."

Scott objected, "We should be so bored by that we'd never learn. What we really want to learn, Janet, is how to speak simple sentences. Let's ask about nouns when we need to know about them. Let's start by talking about Mr. G's slides."

Mr. G said, "We seem to have several suggestions here. Two suggest lists of words or lists of nouns, adjectives, and verbs. Two others suggest learning names of things in the room or discussing my slides. Scott has defined our basic problem as learning to speak simple sentences. How do the rest of you feel about this?"

After the class had discussed the basic problem, they began to define subproblems and to consider how to solve them, returning to the suggestions which Mr. G had outlined, adding others, and working finally to consensus. Their decision, written for them on the chalkboard, read as follows: "Basic problem—How can we learn to speak simple sentences so as to understand one another in French? Subproblems—How shall we relate the written word to the spoken? Where can we begin? Procedure—We shall practice with a few objects pictured in one of Mr. G's slides. He will tell us the translation and someone in the class will write the word on the board. From this he will help us to build simple sentences, and we shall look in our books to find out more about adjectives and nouns and verbs."

A discussion at the beginning of a learning unit is designed to bring the pupil into a responsible role in his own education. He feels his part in deciding his welfare (develops a sense of security and belonging) since he plans his own methods in working out a group approach. The discussion also assists the pupils to define problems, and the problems will be accepted, if the group as a whole has had a part in setting them. Furthermore, the discussion group may elicit opinions about the issues and concerns that are most relevant to adolescents.

In solving the defined problem at step 4 (when all new information and opinions are pulled together and individual hypotheses are formed after research is complete), discussion is also important, as it is in considering the hypotheses and their place in other learning, and in formulating judgments. However, the discussion at these steps (unlike the earlier interchange of ideas) is not expected to reach consensus.

The hypotheses and judgments which each student arrives at are individual, distinct from those of every other student. Thus in the discussion which will summarize all new information and opinion, John may say that he now sees that in French adjectives agree with nouns which are, strangely and with little rhyme or reason (to him), either masculine or feminine. Amy may state that she has learned that French sounds soft and rhythmical when spoken, but that it is hard to make a person's tongue (her tongue really) get around the sounds. Russ may have learned that verbs change endings according to the person and that the same thing happens in English—which is surprising (to him). Another student may offer the hypothesis that the best way to learn French is to look for all the words that are similar to their English synonyms. If during the class someone raises the problem, "Is Parisian or Canadian French better?" the teacher knows that nothing could be less educational than to expect the whole class to decide upon the superiority of one or the other. Nor can he expect that every member of the class will know the same words, the same sentences, the same irregular verbs, after the unit on simple words and sentences is finished.

During step 5 and in formulating judgments, final thoughts should often be written down individually by each student as a way to fix his decisions in his mind. At times the discussion should include a consideration of the steps used in arriving at the decisions. Russ may write down one of his findings thus: "Verbs in English and French change endings according to the person speaking." Later he may add to his ideas some mentioned by other students. The discussion at this stage should be directed by the teacher toward a consideration of how the learning will be utilized later. Russ may say that verbs in French may be classified in three groups, depending on the ending of the infinitive, and that he is going to find out just where they are alike and different so that he can use them accurately. Other students will add their ideas. Finally at this stage the teacher may ask, "How well did we do in defining our problem and solving it?"

In helping students to form judgments which evolve from their hypotheses, the teacher may ask, "What difference do these ideas make to you? What do you plan to do with them?" Then Russ may say, "These little details are only something to build on, but I hope to learn to use them so that I can go to France and live with the people and

see things and learn things." The teacher has obviously been successful in trying to emphasize goals and ideals.

Discussion, then, is used at three phases of problem solving, as well as in forming judgments. It is a way, at these stages, to arouse new anxieties, and to help students to consider hypotheses in cooperation with the teacher. It must take place in an atmosphere of uninhibited communication, where students argue together, agree and disagree, freely finding or rejecting solutions to incidental problems while staying reasonably within the limits of solving the over-all problem.

Since we realize that the teacher is not always adept at making students aware of their motivation to learn, let us consider again the use of discussion in a French class, assuming that this group did not seem to feel interest. After the teacher had offered his introduction, with his slides and a few explanatory remarks, the students failed to enter into a discussion of what they wanted to learn. The teacher, because he wanted to work in cooperation with the students, paused to discuss their feelings in the matter. It happened that the students were in the lower socioeconomic group and therefore had little interest in the values of other groups.

The teacher said, "Most of you will be entering the service in the near future. Do you expect to go to France or Switzerland or Monaco? You girls who marry these boys, will you be going along as their wives? *Voulez-vous prendre une tasse de thé?* Too bad. You won't be able to get any food because no one at the *pension* speaks English." He appeals to their need to succeed, to belong, to be independent in a social area, but he talks of situations which might occur in the lives of the group which he is teaching.

Possibly the group may still not respond, may sit looking at the teacher with lackluster eyes when he tries to move ahead to a definition of problems. Here the teacher, aware of the feelings of his group, stops his teaching and attempts to reflect feelings. "You don't seem very happy about this idea. Is it that you are just unhappy because it's Monday, or are you afraid you won't like French?" In other words, he continues to work with needs, but for the moment drops them in relation to the subject matter, trying instead to find out the feelings which are getting in the way of proceeding with the learning. If he persists, students will begin to talk of their likes and dislikes, and from there the teacher can again return to showing them their felt needs in rela-

tion to a study of French. There is no point in attempting to work on the definition of problems until the teacher feels sure that most students have realized that they need the topic under study. He may have to review again and again the ways to know his students, the ways to promote cooperation, and the ways to motivate and provide the broad approach.

Discussion and Group Dynamics

The emphasis of discussion is upon the group. Slavson writes, "When we deal with groups, we deal with the very essence of life, and the persistent oversight of group attitudes and group pressures in education and therapy has retarded our understanding of man and his motives."¹ Thus the basic gregariousness of adolescence should help the teacher to promote good discussion.

In a similar vein Lewin says, "The group to which a child belongs is the ground on which he stands. His relation to this group and his status in it are the most important factors for his feeling of security or insecurity."² As the small peer groups are expanded to a total group, the needs of adolescents are met automatically in the situation. In recent years experimental studies in group dynamics have emphasized the need for personal interactions with fellow men in all aspects of living. Political, economic, and social issues have been solved in a democracy because people were able to discuss issues and thus understand one another.

Discussion is the flow of words which takes place among the members of a group and their leader, as they attempt to define their problems or to discover answers to them. It is a form of group work, that is, "planned, shared experiences in which desirable changes take place in the members individually and in the group as a whole."³ The desirable changes in the group members occur in thinking and judgment as well as in interchanging ideas about needs; they include planning and acting together. An understanding of group dynamics should help

¹ Samuel R. Slavson (ed.), *The Practice of Group Therapy*, International Universities Press, New York, 1947, p. 25.

² Kurt Lewin, *Resolving Social Conflicts*, Harper & Brothers, New York, 1948, p. 82.

³ Ruth Strang, *Group Activities in College and Secondary School*, Harper & Brothers, New York, 1946, pp. 3-4.

the teacher to make discussion a worthwhile technic for critical thinking.

When and Where Group Discussions

As all teachers realize, discussions may occur at a moment's notice. A teacher or student may inadvertently phrase a problem such as, "Would it be right for me to attend a formal dance in slacks if I wanted to?" Interested students quickly rise to the challenge, often with heated discussion. Or the teacher may offer a prepared problem which produces immediate discussion because it awakens immediate anxiety in a number of students. "If Hamlet lived right now, would you want him as a friend?" If the problem has no solution, the teacher merely allows the theme to develop, emphasizing the aids to clear thinking. Step 3, the laboratory step, is often supplied by the students as they offer the necessary information. In the first problem they may mention facts (as far as they know them) about social conventions, parents' demands, and feelings of others. In the problem about Hamlet, if they know the play thoroughly, they may suggest reasons for or against having him as a friend. If they do not, then research for the necessary information is in order.

At the end of the discussion of such brief problems the teacher says, "It's good to look at this idea for a while. It gives us something to think about. But of course there isn't any answer, and we can't expect to agree. Each one of you will need to draw your own conclusions. Do you want to jot them down now?" Here thinking takes place individually and results in individual hypotheses and judgments. This is the most common form of discussion.

Discussion in the more formal unit utilizes the same four steps (1, 2, 4, and 5) as does discussion of a very brief problem. Discussions are not to be left to classes in history and English and problems of democracy. They are as necessary in mathematics and science, in business training and home economics. The talented teacher feels that discussions must be utilized in all classes, discussions which provide the sense of freedom which truly allows students to talk about and to discover their own answers.

Today it is believed that the experience of discussion is in itself valuable in promoting thinking. The students in the group realize after

a time that the teacher will accept as worthy of consideration whatever comment they offer. They then commence to accept in their turn, and cooperation evolves. Also, as their comments are accepted, the students no longer feel that they must make socially acceptable remarks (to gain love and security), and they grow more willing to utter real opinions. Cantor quotes a student who said, "I'm pretty sure that much of the time was spent in feeling each other out, trying to discover how much we could risk of ourselves in the presence of each other."⁴ As the student hears his real opinions verbalized, perhaps considered or rejected by group members, this new information helps him to formulate a decision or a new opinion based on more firm foundations.

Kubie writes about a "Fifth Freedom, the child's right to know his own feelings and thoughts and impulses—not to act them out blindly, but to be consciously aware of them. This is where education and preventative psychiatry merge."⁵ Discussion, hearing his ideas stated aloud, and coming to accept them, all aid the student to gain something of this freedom which Kubie desires.

As an example, let us consider a basic course in physics. Probably one of the chief reasons that young people fail to develop a vital interest in science is that they lack understanding of the basic measuring tools and terms used by the scientist. The unit on measurement is generally the first one found in a physics book; yet few science books which we have examined have considered this introductory unit as anything more than additive material that must be memorized for future use. "We shall have frequent use for the values of the density of water and the density of mercury. You should fix these values well in mind."⁶

There are ways of using discussion in a physics course that might help students to gain interest and define their problems and their way of attack. One teacher adopted a provocative method. Mr. S mimeographed a number of questions, which he distributed to his class. They were entitled "A Basic Thought," and ran as follows: "Why do people need to be precise in measurement? Would you want your druggist to

⁴ Nathaniel Cantor, *The Teaching-Learning Process*, The Dryden Press, Inc., New York, 1953, pp. 157–158.

⁵ Lawrence S. Kubie, "The Psychiatrist Considers Curriculum Development," *Teachers College Record*, vol. 50, pp. 244–246, January, 1949.

⁶ Walter G. Marburger and Charles W. Hoffman, *Physics for Our Times*, McGraw-Hill Book Company, Inc., New York, 1955, p. 21.

measure out the ingredients of a prescription as your mother measures a cup of milk or a tablespoon of butter in her kitchen? Would you want your gasoline measured by crude and approximate gauges? Wouldn't your father call the electric company quickly if your monthly bill ran ten or twelve dollars above average? How would you like to be timed in a track or swimming meet or in a football game by a wrist watch? Would you want to buy a diamond weighed on a butcher's scales? What would our lives be like if no central agency in the United States kept a standard time check every hour of the day?"

Mr. S let his class read these "thoughts" for a few moments and then asked the students which of the questions concerned them most. Discussion resulted. Robert replied that the first one about the druggist was very real to him since he once heard of a baby who almost lost his life because a druggist measured incorrectly. Jane said she had also heard about druggists making mistakes, and she wondered if this was one of the reasons why druggists took examinations before they could be registered. These students felt anxiety at this point.

Marian asked the teacher what type of measuring instruments druggists use. Mr. S could easily have answered, but Jimmy said his uncle was a druggist and that he was very careful when filling prescriptions to get exact amounts of each ingredient ordered by the doctor, and that he used small metal weights on balance scales and bottles marked off in graded scales on the sides. Jim was not sure of the size of these grades, but he knew his uncle had to be careful to account for water or chemical clinging to the sides of the measuring tube.

At this point Mr. S said, "Well, it seems to me we have so far brought out one good reason why people must measure precisely, that is, the matter of protecting human life. What major problem does this bring to us now?"

Bob said, "It looks as though we've got to learn how to weigh small quantities and measure small volumes of liquid if we expect to measure as accurately as a druggist. When I say small I mean not in quarts and pounds—the way we usually think of measuring."

Mr. S suggested that each student write the general problem on the mimeographed sheet in his own words. He said that the class would return to this problem and others decided upon, as they studied the unit. Next he asked, "Is anyone concerned about any of the other questions?"

Harold had often seen on gas pumps and scales in stores a sticker saying the equipment had been inspected for accuracy on a certain date. He wished to know how this was done. He wondered if many people were cheated at gasoline stations and stores because of inaccurate scales. He wanted to know if the class could learn to check a typical spring scale for accuracy. This problem was also listed on the sheet.

As we have said, some students will not be willing to engage in critical thinking. For example, Bernard said he was unsure of just what was going on. "Mr. S, you know we've got to learn these units of measurement in our first chapter, so why don't you just assign the chapter to us tonight and test us tomorrow to see if we can remember them?" Bernard was one of the better students in the class; several other students agreed with his comment. At this point the role of past conditioning was evident. Bernard wanted a grade and was willing to memorize to achieve his goal.

Mr. S accepted Bernard's remark courteously, and spent some time explaining to the class the youngster's feelings and point of view. Next he advanced beyond sympathetic understanding by asking Bernard and the class what they thought about spending time memorizing tables that they would probably not use in their entirety. Then he returned to a review of their reasons for wanting to learn about a particular topic. "Do you think an engineer or scientist memorizes all the tables he uses?" Students made comments such as, "He learns the units he uses every day, but the scientist relies on handbooks for formulas," and, "He knows where to find information and how to use it."

Here Mr. S attempted to persuade Bernard and his followers to mention some of the problems about measurement which they felt would be important to them, using his knowledge of Bernard's hopes for a scientific career. He was attempting to lead the boy to consider critically his desire to memorize for a grade in the light of his goal; and he was doing this first by understanding Bernard's feelings and then by helping him to evaluate them.

The rest of that class period and most of the next were spent in discussion of the sort described. Reasons for studying measurements were developed, and some particular problems to be pursued were outlined; each class member kept an account of progress.

We discover in this illustration the way the discussion technic helps students to consider what they already know and want to know, and

to define problems at the beginning of a unit or topic. The teacher plans the questions relating to the possible concerns of adolescents, attempting to show them that they feel problems within the topic; then he encourages them to exchange ideas about their reasons for delving more deeply; finally he helps them to pinpoint and define their specific problems through discussion (steps 1 and 2). He then helps the students to decide (again through discussion) how they will study the problems they raise. Often this approach will be so casual that the students will be unaware of the steps of thinking.

Step 3, carrying out research for information and attitudes, is accomplished through the laboratory technic. Laboratory equipment will be necessary at this point in problem solving. Even if students wish to consider the problem, "Should one accept Negroes in all social situations?" they will need to engage in research of expert opinion before coming together for discussion of their questions. If they wish to discover, in their study of mathematics, how to remove parentheses around an expression when preceded by a negative sign, research is necessary. They engage in research when they use scientific equipment in the physics class.

Let us assume that one of the problems with which Mr. S's class was concerned dealt specifically with the druggist. It was phrased, "Can we, as students, learn to measure accurately enough to put up a prescription?" Jim and several members of the class volunteered to visit his uncle and to find out the tools he used for measurement. They returned with the following ideas: "The instrument used to weigh solids is called a balance, and the weights used are grams, milligrams, grains, scruples, and drams; the last three are apothecary weights and the first two, metric weights. The instrument used to measure liquids is called a graduate. It measures in units of millimeters or centimeters, is called a graduate. It measures in units of millimeters or centimeters, drams, ounces, and minims. One dram equals one teaspoonful, eight drams equal one ounce."

Mr. S then brought out three of his balance scales with weights, and five graduates. He demonstrated how each was used and mentioned precautions that need to be taken when using the instruments. He suggested that the class might like to use the tools to discover if they could answer their basic problem. The class was eager to try. The teacher took a small amount of a solid and asked different groups to weigh it on the balance, each group independent of the others, and then to write down its correct weight. He also partially filled several graduates,

numbered them, and passed them around the class for students to read the amount of liquid in each and again, individually and independently, to record the results. When each class member had had his chance to read the instruments, the teacher called the group together.

"Now, we wanted to determine whether or not we could measure accurately enough to make up a prescription. I wonder how well we agree with one another. Why don't you pass your papers with your readings to Bill? He will read them off while Henry lists the results on the board."

Although the results of the readings on the balance and graduate were very consistent, there were several instances of disagreement among the students. Mr. S asked why these findings failed to agree with the others, and discussion based on facts and experimentation began (step 4) after students had again checked their books and resource material to be certain they understood the problem.

Several students voiced hypotheses. Jane said that perhaps some people are not precise in their work and are willing to settle for a close approximation. John felt that in weighing such light material it was often difficult to decide when a balance scale was really in balance, and that an added or subtracted weight might not appreciably affect the balance to the human eye. Robert suggested that it was difficult to read a graduate because the liquid does not run flat across at the top; he thought that some of the class might have misunderstood how to read a liquid in a tube. Marian suggested that it was entirely possible to make an error in reading the gradations on the graduate. Charles suggested that Mr. S verify their readings. This he did. Most students hypothesized that they could now measure accurately enough to put up a prescription if they were careful in measuring and ran at least two trials for verification. Some suggested that students would never be careful enough, and some that only one extra trial was really necessary. A summary by the teacher helped to reemphasize what had been learned.

The final value of the discussion appears when the class has pursued a topic to the point of final judgment and appraisal of its relation to other learnings (step 5). Raising general questions that have a bearing on the entire learning activity helps the student to summarize and evaluate, and gives the teacher a means of finding out when learning has not been strong or when misunderstandings have arisen. It

helps students to connect the material that has been studied with present knowledge and possible future learning, so that the major implications will be evident; it helps them to plan ways to retest their knowledge. At the same time class members may inform one another of individual judgments arrived at, or of reasons for not being able to arrive at a decision as yet. New problems may be raised for present or future consideration.

To illustrate, let us return to the physics class. The general problem was defined, "Why do we and others have to be precise in measurement?" While solving their subproblems, the students learned how to measure weights of solids, quantities of liquids, and linear lengths. They did not memorize equivalents but learned how to use them in problems.

Let us assume that the topic of measurement is nearly complete. Mr. S says, "We have spent some time on this unit, and we are now ready to summarize our thoughts in preparation for our next topic. You will recall that our original concern was to understand why we had to be precise in measurement. We have worked at some real problems during the past two weeks; we have used our books to become familiar with the language and tables used in measurement; and we have practiced solving theoretical problems from our text to get experience in using measurement. I think you know, from the original questions I asked, why I personally think precise measurement is important in our world. As a physicist, as an amateur jewelry maker, I particularly appreciate the need for careful measurement and for well-made means of measurement. Now are we ready to summarize our thoughts as a class and to consider their relation to our next topic?"

John volunteered, "I feel that I have gained my first real understanding of the metric system. I've had it before in other classes but never really understood what I was doing. I can now see why I have to be precise in my own life, because I want to go to engineering school where precision will be really necessary. I'm still confused about when and when not to use the metric system instead of the English measures. I have heard my buddies talking about clearances in their hot rod engines being so many thousandths of an inch, and I wonder if the automotive industry is still using the inch-foot system of measurement."

"John, you have brought out one reason for precise measurement, or

really two. Your first point was that you will need this information as a basis for your future. Your second point is more hidden, but I guess you know that an automobile engine would use a lot of oil and be noisy if parts weren't machined down to small fractions of an inch; so the second reason for being precise concerns machine-operating efficiency. Now would someone like to discuss John's question?"

Students maintained that the matter was confusing. One said that according to the book the metric system is used almost entirely in scientific work. Another said that industry still uses the English system, and the teacher verified his statement, adding the idea that this system is particularly necessary in interpreting a product to the public.

Then other students offered further reasons for precision in measurement. Mr. S helped them to talk with one another and frequently summarized. He also wrote the main ideas on the chalkboard. Then he said, "We have listed many reasons why precise measurement is necessary for us and for others, and the ways we think our understandings will apply to the future. We have agreed that each one will keep his own notebook of ideas and reasons. Then we can refer back to them when we need to. Our next topic has to do with forces and pressures, and here we can use what we already know in terms of inches and pounds, or grams and centimeters, to measure water and other fluid pressures. Have you arrived at any further personal judgments about precision in measurement? Does the learning matter to you?"

Barbie commented that she was afraid of measures now because someone's whole life might depend on them. "I don't think I could be responsible for anything more than measuring a cup of flour." The teacher and class discussed Barbie's judgment, and one student said he thought she might later gain the necessary confidence. Other judgments ranged from "I want to become accurate enough to make my hot rod really smooth" to "I want to use precise measurement so that later I can calculate in work with rockets."

Although the teacher would not always review the process for fear of making it mechanical, he said this time, "Now, how well did we define our problem and work on it?"

We see in the foregoing narrative an example of the use of discussion in several steps as a means of covering a large class problem. We see that although hypotheses and judgments differ among the students,

through discussion many possible areas of interest have been sighted, and the students have secured a beachhead on the shores of critical thinking.

The Teacher's Role

The teacher, though always a leader, should encourage more and more interchanges of opinions and information among students and discourage to a certain degree exchanges between pupil and teacher. Thus he may strengthen mutual respect.

When a discussion of either a small or a large problem is once under way, a teacher has many responsibilities. He must see that pupils do not make broad generalizations that lack factual verification, that they listen, weigh the opinions of others, and attempt to distinguish tolerance of people from acceptance of their ideas. He should not allow the class to wander too far before bringing them back to the original purpose of the discussion. He must be alert to see that not just a few monopolize the discussion, or that one or two subgroups remain too closely knit. From time to time he needs to summarize what has been said or accomplished to date, and when he can, he should help students to summarize. The teacher must consider time also. Discussions that are left without summary until the following day often lose their emphasis.

Grambs classifies these various roles into three categories: the backstop, to toss questions back to the group; the traffic policeman, to direct the flow of questions and help certain pupils take turns answering; and the guide, to stop from time to time to show the group their progress, wrong turns, present direction, and to advance toward the goal.⁷

A sense of humor helps the teacher also. Progress does not always develop in a discussion as planned or expected. The teacher who adjusts to a situation and laughs with the group will aid them to achieve thinking and judgment through discussion. Furthermore, the teacher must be careful not to monopolize "discussion" between himself and his students. He must remember that it takes place even more valuably among class members.

⁷ Adapted from *Modern Methods in Secondary Education*, by Jean D. Grambs and William J. Iverson, by permission of The Dryden Press, Inc. Copyright 1952 by Jean D. Grambs and William J. Iverson.

It is extremely important that the teacher prepare very carefully. For the topics to be discussed, the teacher must possess extensive information, attitudes, hypotheses, and judgments. He must be prepared also to suggest further sources of information when students need them. If he does not know his topic thoroughly, he fails to recognize generalizations, digressions, even false information. If he does know the field of study, he can often point to new avenues for exploration.

Problems and Criticisms of the Discussion Technic

The most frequent criticism of discussion concerns covering the material. Strong and weak teachers and students say that group exchange of ideas wastes valuable time needed for learning. It is true that discussions often wander, but if a student gains anxiety in a discussion, he should be motivated to search for needed information or content.

Although the criticism is often made that teachers cannot determine how much a student knows when the discussion technic is used, the validity of this idea depends upon one's goal. True, we cannot be certain that every member of the class knows facts one through ten, but by discussions we can obtain a more valuable estimate of how each student applies information, that is, uses it in critical thinking.

Actual research in the field of discussion is meager. Although many studies on group dynamics may conceivably apply to classroom discussion, we cannot assume that the findings are always applicable. Another sort of experiment has compared the discussion with the lecture. The experiments seem to show that discussion is generally equal or superior to the lecture. It is apparently more effective in securing retention and also in stimulating critical thinking, because it helps students to attain a deeper understanding of subject matter. It also has greater effect on attitudes and contributes better to desirable classroom relations.^a Although these research findings may justify the use of discussion to some extent, much further evidence is needed. Actually all of the technics overlap, and it is therefore very difficult to compare and really evaluate them. In the meantime we must apply findings in group dynamics where they seem to apply and accept the view of most researchers that discussion is valuable. Exactly where and how to use it,

^a Thomas F. Stovall, "Lecture vs. Discussion," *Phi Delta Kappan*, vol. 39, pp. 255-258, March, 1958.

teachers must determine by the ability and interest of the group as a whole and by the levels and needs of individuals.

Other Views

Further enlightenment on the discussion technic may be gained from periodicals and current literature. The viewpoints expressed, the definition of terms, the suggested use of the technic, may vary from what has been written above. Because thinking is based upon information and attitudes, we hope that these approaches may be of some value to the reader. We hope they may enhance learning, promote further thinking, and perhaps lead still closer to hypotheses and judgments. The following are excerpts and summaries from periodicals:

Class Climate. The class is a group. Adequate understanding and training in group methods can provide for shared problem solving and for growth, and can contribute to the improvement of the learning process. The group process aids in reaching the following goals: active student participation in learning, the forming of creative and independent students rather than conformists, shared problem solving, the encouragement of a feeling of acceptance, creation of environment receptive for growth, practice in democratic living.⁹

Active Classroom Discussion. The following methods were used in a current-events class to help young people to express themselves naturally, to reason carefully and clearly, to prevent extroverts from monopolizing the discussion, and to include the shy.

Chairs were arranged in a circle. No note taking was permitted, and hand raising was abolished. After the teacher had presented a brief preview of the subject, pupils were encouraged to bring in ideas from reading. They were then allowed to debate the questions at hand, one pupil challenging another's reasons for his opinions. The teacher remained in the background, interrupting only when discussion lagged; he pointed out conclusions that had been drawn. Later a pupil served as leader. The students felt enthusiasm for the plan.¹⁰

Group Evaluations. In an Illinois high school, students engaged in

⁹ Jack R. Gibb, "Climate for Growth," *NEA Journal*, vol. 45, pp. 23-24, January, 1956.

¹⁰ Katherine L. Biehl, "Teaching Current Events," *Social Education*, vol. 15, pp. 331-332, November, 1951.

group work for discussion and criticism of current juke box stars, a matter obviously of great interest to them. They expressed and recorded opinions; they offered reasons for opinions; they formulated statements in support of the reasons; they analyzed and established rules or standards; finally they made judgments on standards. After doing this, they turned to evaluating the Declaration of Independence, using the same means for evaluation. Finally, they turned to criticism, attempting to find the ratings, reasons, and rules used by critics in appraising books.¹¹

Leadership. There are five possible subjects of analysis used in defining leadership: personal traits, behavior according to situations, behaviors or functions, "styles," such as laissez-faire or autocratic, and functions or acts required by the group. The functional approaches involves a concern for group action and includes all approaches except the analysis of traits; it seems most acceptable. Leadership falls into two categories: attainment of group goal and maintenance of the group itself. For best results, leadership within the group should be well spread out and distributed. Though group decisions take longer to formulate, their implementation under distributed leadership is more rapid. Leaders and their trainers need to make understanding of the democratic processes real.¹²

Leader and Member Roles. The leader balances responsibility for directing the group between himself and the group members, always avoiding thinking for the group but directing their thinking. He holds the group to their goal, helping them to discover what help they think they want. He focuses on the purposes of the group. He encourages members to present their differences, and he keeps the group in constant interaction, so that creativity will not be blocked. He keeps the differences of the total group in mind, and stresses likenesses and differences with no aim for consensus or for disagreement. As a result, the group members should learn to relate to one another and be willing to work together.¹³

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¹¹ Mary Jane Aschner, "Teaching the Anatomy of Criticism," *The School Review*, vol. 64, pp. 317-322, October, 1956.

¹² Gordon L. Lippitt, "What Do We Know about Leadership?" *NEA Journal*, vol. 44, pp. 556-557, December, 1955.

¹³ Nathaniel Cantor, "Focus and Function in Group Discussion," *Teachers College Record*, vol. 53, pp. 375-382, April, 1952.

The talented teacher spends some of his time utilizing the discussion technic. Of all the possible technics, discussion is the most important. We realize that the reader's hypothesis and judgment may be different. If he has developed his own theory about discussion, understanding its purpose and means and also its place in critical thinking, he may then say that he has formed his hypotheses about discussion. He must test these hypotheses when he has the opportunity. If he decides against the use of much discussion, or if he decides to use discussion as his primary technic, he should have formed this judgment after a careful pursuit of problem solving on the general subject of discussion, and after a consideration of the personal qualities which would enable him to become a good discussion leader. Then further testing should aid him to strengthen or to reevaluate his decision.

The choice of which technic to use depends upon its validity for the step in critical thinking being undertaken (remembering that discussion is inappropriate in research), upon the teacher's feelings about which technic will be most effective, upon the background of the class (although discussion technics may be taught), and upon the teacher's choice of that technic in which he feels most comfortable.

LEARNING MATERIALS

*Suggestions for Further Reading**

1. Elliott, Harrison S.: *The Process of Group Thinking*, Association Press, New York, 1932.
2. McBurney, James H., and Kenneth G. Hance: *Discussion in Human Affairs*, Harper & Brothers, New York, 1950.

* See also the summaries of articles under the heading *Other Views* in this chapter. See also the list following Chapter 11.



7

The Multisensory Technic

The common term “audio-visual” is confusing. Teaching through the senses should include smell and taste—used, for instance, in science and home economics—and touch—used in construction and modeling or in examining materials. In most cases, of course, the senses appealed to will be either hearing or seeing, which latter includes visualizing, as in interpreting a chart or diagram. We therefore speak of “multisensory” rather than audio-visual technic.

The multisensory technic, like the discussion, is not intended for use alone, to the exclusion of other approaches. In order for students to reach a point in their learning where hypotheses and judgment result, the need for clear explanations of new ideas, concepts, operations, or information is obvious. A teacher cannot explain well when he is unaware of the purposes and limitations of learning aids and of his role in applying the multisensory technic.

The Purposes and Limitations of Multisensory Aids

The multisensory technic is the use by the teacher of any auditory or visual device, or of any other medium appealing to other senses, which helps students to grasp a fact, an idea, a concept, or an attitude. The multisensory technic of teaching has attained a point in educational circles in recent years that impels teachers to understand the utility of such aids. World War II mass-training technics prompted much research in the use of teaching devices; larger public school classes have created added interest in multisensory aids; finally television has surpassed the disappointing use of radio in the classroom. Some articles about multisensory devices have offered them as the answer to teacher shortages. It is true that teaching aids assist teachers to add concreteness to their presentation of material; and teachers must know how to plan for, to use, and to evaluate these aids. In this section we write of the various aspects of the subject to which every teacher must give understanding consideration if he is to be properly equipped for his profession.

Purposes. We stated previously that the talented teacher holds a ready answer to why he uses a certain approach in his classroom. He can explain why he uses the blackboard, a demonstration, a film, or some other learning device. To stimulate thinking, let us glance for the moment at reasons why the teacher may employ multisensory aids. Umstatted offers the following reasons among others: to give correct initial concepts, to broaden the sensory experiences of the learner, to intensify impressions, to give vicarious experiences in activities outside the pupil's environment, to give experience with concrete things, to supplement other learning.¹ The teacher who can lead his class to anxiety by his approaches to their adolescent needs, and who knows also that not all of the experiences necessary to learning in our complicated environment can be lived through personally, is the teacher who is aware of the contributions to be offered through multisensory devices. If he fails to employ this teaching technic, he comprehends little of the role the senses play in the steps of thinking. On the other hand, there are many teachers, untrained in the use of multisensory approaches, who, because of their basic knowledge of how students

¹ J. G. Umstatted, *Secondary School Teaching*, Ginn & Company, Boston, 1953, pp. 294-297.

learn, constantly employ these explanatory technics to help students perceive a difficult activity more clearly. As Comenius wrote,

The sense of hearing should always be joined with that of sight, and the tongue should be trained in conjunction with the hand. The subjects should not just be taught orally, and thus appeal to the ear alone, but should be pictorially illustrated. It is wise to represent pictorially on the walls of the classroom all that is treated of.

Often multisensory aids are employed without purpose. We have visited schoolrooms where a movie was shown each Friday to all social studies classes. The movie was not integrated with class study. It was a period of entertainment for pupils and a holiday for teachers. We have observed in other schools that many teachers showed a particular movie just because it was available; again there was no planned learning experience integrated with the problems faced by the class. Movies and other forms of visual aids shown in special rooms seldom advance learning, because the student is moved from his accustomed class situation and placed in an "entertainment" room.

Multisensory materials utilize different senses for intensifying learning. Most teachers write frequently on the blackboard, a visual aid to learning. The talented teacher uses the board because it is a tool that permits him to restate in a different form what has been described or discussed orally. He draws a picture or chart because the printed page or a verbal concept fails to state a point clearly. The chalkboard is a tool to assist the teacher in explaining, clarifying, and summarizing material, while the student watches and often finds that he can understand and learn much more easily than without the board. Aids enable teachers to fashion a learning experience in a more concrete manner, and they impel students to relate abstract theory to something which may be seen, heard, or touched.

Limitations. Although certain limitations exist for this technic, teachers need no excuse for its use. For example, Allen writes, "In every study that has come to my attention, instruction by TV has proven to be at least as effective as by conventional methods of teaching. . . . It appears that instruction by means of films and TV are, in the teaching of certain kinds of subject matters, as good or better teaching techniques than the usual teacher standing in front of a class of students."²

² William Allen, "Television and the Crisis in Education," *Education*, vol. 75, pp. 611-615, June, 1955.

A recent study in Detroit offers evidence that teaching by TV reduces tardiness and absenteeism, controls bad behavior, and improves learning. TV classes, in a year study, improved over those taught conventionally.³

Nevertheless, when multisensory aids are suggested, teachers and administrators are often concerned about cost. While it is true that many commercial aids, such as projectors and recorders, cost from \$100 to \$500, most aids are relatively inexpensive. Teachers with ingenuity may collect many valuable aids from travel experience, industry, the community, and students. Cost undoubtedly places some limitation on their use, but not so much as some teachers pretend.

Another limitation in the administration of multisensory aids is their availability at the moment when they naturally fit into a planned unit or topic. Often a movie which would have enhanced learning about a particular lesson arrives late or not at all because it was not ordered early enough in the year. When there is no central agency in a school responsible for multisensory aids, renting or purchasing materials is often difficult.

If students are not trained to run equipment, some teachers will not be skillful enough to run and maintain it, and to care for emergencies that often arise with mechanical devices. Some teachers—especially those who often decline to use an aid rather than to involve themselves in women—decline to use an aid rather than to involve themselves in mechanics. Mechanical breakdowns occur occasionally with multisensory aids, and unless a teacher knows the machine well enough to make repairs, he must plan alternatives.

Despite the several limitations mentioned, teachers will surely employ multisensory aids such as movies, slides, television, and tapes more frequently in the years ahead than they did in the past. Hoban and van Ormer's famous report demonstrates conclusively that instructional films can teach at least as well as conventional ways of instruction.⁴

If we can rely on their careful research, we are certainly justified in the use of this technic, not just as an aid, but as an integral part of critical thinking.

An Example. Although it is difficult to explain the technic because there are so many varied types of multisensory aids, we shall discuss

³ "Educational Ticker Tape," *School and Society*, vol. 87, p. 58, Feb. 14, 1959.

⁴ Charles F. Hoban and Edward B. van Ormer. *Instructional Film Research 1918-1950*, Special Devices Center, Port Washington, N.Y., 1950.

a procedure that, with adjustments, would apply to most equipment used. In any one class period a teacher might utilize his chalkboard, a picture from his personal collection, charts, models, movies, slides, or recorders in order to vitalize the process of learning.

In one course in social problems, the class was to study a unit on cultures less civilized than their own. They were to begin with a Polynesian group and later to compare it with an American Indian culture. They defined their problem, "What do we want to know about these peoples?" Having decided that they must limit themselves, they finally defined a second problem: "How can we discover the living standards of these people? Can we reconstruct a typical day in the life of a Polynesian?" From such a reconstruction they hoped to have a picture of ways of living, ideals, and moral and economic standards. Finally the teacher said, "I spent a year on American Samoa. If you would care to study Samoa, I can bring in some items of interest." The stage was set for the use of multisensory aids as one technic for solving the students' problem. The teacher brought to class photographs of the island and its people. He introduced some items he had collected—a grass skirt, a model of a typical outrigger canoe, a woven rug. With these aids he explained the uses, materials, and methods of construction of certain tools or adjuncts of primitive life. He helped the students later to find other material: Margaret Mead's book, maps, a movie about life in Samoa, a South Sea island song played on a phonograph, and a coconut, which was sampled by the group. The aids, used carefully as one means of reconstructing life on American Samoa and thus as a step to solving the larger student problem, appealed to the senses of tasting, touching, hearing, seeing. Experience with the various devices aroused anxiety and raised many further questions which were integrated into the general problem of studying the differences among various cultures.

For the moment let us suppose that there are two students, Pauline and Al, who fail to feel anxiety as a result of the initial presentation, who drift along in defining the problem, and who obviously have learned nothing from the teacher's several multisensory devices. Pauline, although her achievement and intelligence indicate that she belongs in this middle-level, non-college group, comes from a low socioeconomic background, while most others in the class come from a higher milieu. The teacher is aware that here may be a clue to Pauline's lack of interest, since many from her level have little interest in the values of

others. Although he does not generalize from this information, he uses it as a possible approach.

The teacher says to Pauline during the research step, "Are you interested in other peoples, like the Samoans, Pauline?"

"Not particularly."

"You think this study isn't of much use, then?"

"I guess so. I've got enough troubles learning about the people I know without worrying about people far away in Samoa."

"You don't think they have anything to teach you, Pauline?"

"Well. I don't know."

"Maybe there is something they do in Samoa which might help you to understand those friends of yours you were talking about."

The teacher attempts to help Pauline and others like her to discover an area of interest and anxiety. If he listens and is not angered by lack of interest, but readily says that he understands it, as he does in the two comments above beginning "you think" and "you don't think," he can often arouse anxiety which was previously lacking. This time the teacher turned back to a discussion in order to attempt to find a way to show a student something she had missed. If he had erred in his judgment about the reasons for Pauline's lack of interest, he would have continued to probe in the hope of discovering other clues.

With Al the teacher used another approach. For some time he had noted that Al daydreamed and failed to pay attention to the progress of the class. Although he approached Al in the same way (and possibly in a small group together with Pauline and others like her), he was unable to arouse interest. Since this problem baffled him, he took it to the guidance department where, after a time, it was discovered that a problem at home was holding Al's attention so exclusively that he could not concentrate on his work in the classroom.

Preliminaries to the Technic

There are so many types of teaching aids available from so many sources that merely finding out what can be used in solving a class difficulty is a study in itself. All new teachers in a school system should be informed about teaching aids available within the school and about obtaining them for class use. If this introduction is not offered during teacher-orientation week, each new teacher should take it upon himself to discover answers to questions such as: Is there a director of

multisensory aids in the school? What service does he provide to the classroom teacher? For instance, does he see that equipment is available when needed? Does he provide machine operators, order films not in stock, and plan for periodic purchases of new teaching aids? If there is no director, the beginning teacher should discover the types of teaching aids owned by the school, the ways to obtain them for his class, the amount of time needed for delivery, and should know what provision the school budget makes to pay for expenses incurred. Teachers should also investigate the many sources of free or inexpensive teaching aids available from industry. Many of them are advertised in professional journals and popular magazines. Thus the first step of the technic is preplanning.

Another form of preplanning is personal collection of materials. Prospective teachers at the undergraduate and graduate levels should be encouraged to collect multisensory items that may assist them in their future careers. Teachers in service should be constantly alert to gather aids from popular magazines, professional journals, vacation travels, and conventions; and they should use their own cameras to record events and places for possible help in future learning activities. Students should be encouraged to do the same. For example, a French teacher, who spent a year studying at the Sorbonne in Paris, traveled widely on the continent and recorded his trips on colored film. When he returned to the States and to his first position, he aroused immediate interest in his class because he illustrated his French lessons. He encouraged his pupils to want to learn to speak the language of the people whose life they saw unfolding before them on the screen.

The second concern in using the multisensory technic is a preview of the materials to be used. A teacher in a world history class which was studying Canada procured a film from a Canadian travel agency. The description in the catalogue seemed to indicate that the film was designed for the topic being studied. Since it was a rented film and arrived on the morning it was to be shown, there was no time for preview. The film showed, instead of wide views of Canada, the reproductive life of Canadian wild animals. Both teacher and students were confused, and a film which might have been extremely valuable at one of the steps of problem solving in a biology class turned a history class into chaos. Teacher security, of course, is not the only reason for previewing multisensory materials. The preview offers the teacher

and pupils the opportunity to plan the use of aids at the proper place and time in solving a problem.

In the actual presentation of the multisensory aid, teachers must consider their own ability to operate machines, or they must find trained student operators. They must ascertain the length of time to be spent in using the device. Provisions must be made, too, for recording ideas or information so that the material presented may be used to solve the problem under consideration.

Place of the Multisensory Technic in Problem Solving

The technic holds real value in awakening anxiety at the beginning of a new topic. At the second part of step 2, determining how to proceed, the technic usually assumes the form of a demonstration by the teacher. In research, multisensory aids may be used to provide information needed to solve defined problems. In forming hypotheses the technic is employed in a limited manner; the teacher may make tape recordings of the summaries of discussion, or write them on the blackboard.

In a core-curriculum plan in the junior year in high school, classes in English, history, and art combined to study the general subject, United States colonies in 1775. In order to arouse anxiety, the history teacher ran a filmstrip depicting the historical sights of the period. Then he arranged a field trip to the colonial reconstructions of nearby Williamsburg. With filmstrip and field trip he pointed out the value for the present in knowing the life of the past (appealing thus to all needs in all of life's areas). The use of the two aids tempted students to discover and explore areas of interest. In the English class, an opaque projector showed excerpts from the writings of Jefferson, Hamilton, Washington, and Franklin, as a way to stimulate interest in the overall core study. Again the teacher was pointing up values in the ideas of the past. The art teacher tacked on the bulletin board a series of reproductions of the art and architecture of the period. In the three classes, the multisensory technic was employed by the teachers through the use of several aids. These devices were, of course, not the only means for arousing anxiety. Frequently the multisensory technic combines cooperatively with other technics.

At step 2, the multisensory technic may aid students to determine

how they will proceed after they have defined their problem. In the history class in the core curriculum, the students defined a problem: "What would my life have been like in Boston in 1775?" They decided that they must first discover what Boston was like in 1775, and that they needed some device for picturing the old town. The teacher accordingly demonstrated the use of materials for drawing to scale a large 6- by 6-foot map of early Boston with important places and buildings marked upon it. At this step, the multisensory technic is usually a means for demonstrating to students ways of moving on to use of materials for research. Thus the students, having learned the technic for map making, turned at step 3 to the actual laboratory experience.

To facilitate research the multisensory technic may present needed ideas or information to students so that they may visualize, hear, or otherwise sense the reality which will aid them to solve defined problems. Movies, recordings, filmstrips, and projections constitute all or part of the research step. In the English class, which had defined a problem, "What kind of writing did people read in 1775?" the teacher, with an opaque projector, showed examples of old books and old newspapers such as the *Boston Gazette*. He then introduced a book of the period and helped the students to decipher the old print. The teacher, of course, is careful to take into consideration range of achievement and ability. Although he might suggest that certain abler students should attempt to work on an old print, he would offer an easier task to those less gifted, such as merely reading the main headings in a copy of the *Boston Gazette*.

Other examples of the use of the multisensory technic in research may be varied. In science the teacher might test a specimen in a biology laboratory through a microprojector, a device which allows many students to follow the test where the ordinary microscope permits only one viewer of a phenomenon at a time. Thus the students would learn a common basis for further research. In biology a film on reproduction should provide the information needed by students to solve their problem in this area. Travel films in geography, movies made in France or Spain in a language class, the presentation of a special local television broadcast in a civics class, the use of charts or pictures in many classes—any of these might constitute the contribution of the multisensory technic to research.

A mathematics teacher, at this step, transported his geometry class on a day-long field trip to a local wooded area, to practice using measuring tapes, transits, and plotting tables, as a way to develop a better understanding of the concepts of surveying through geometry. They applied textbook theory to reading distance on a steel tape and angles on a transit, and figured areas as determined by these measurements. They made measurements in the field, calculations in the mathematics laboratory. Thus mathematics assumed the characteristics of a real-life study.

At step 4 the common multisensory aids will not be utilized by the teacher. However, here is the time to record discussion on the chalkboard or to play back tapes of previous discussion. At such a moment of summarization, the list of ideas on the board should help students to sense a rounded concreteness in their learning and thus to form more realistically their own hypotheses and judgments.

As with all technics, the teacher must be alert to the reactions of the individual students in his class. After a time he may be aware that Martin very quickly grasps concrete material which he can cope with through multisensory devices, but that pure verbal development of an idea is more difficult for him. Therefore, wherever possible, he helps Martin to put the subject matter into multisensory form. Ava, on the other hand, seems impatient with multisensory forms, but learns through the pure verbal expression she so much enjoys. Wherever possible, the teacher helps Ava to deal with the ideas and attitudes of others instead of with multisensory devices. While it is generally true that the slower student learns more from concrete material, and thus will usually profit from the multisensory technic, it does not follow that the brilliant student, particularly one interested in science, will not also find it helpful.

The Demonstration

A demonstration by the teacher is but another example of the use of the multisensory technic. Since this aspect of the technic is so often carried out in the classroom, we offer a brief discussion of it with some examples of its use.

The teacher employs the demonstration to show pupils how to manipulate equipment and apparatus, how to solve an example in

mathematics, how to hold the lips and tongue in speaking a foreign language, how to move the eyes when reading correctly. The common elements of the demonstration appear to be a "how-to" explanation as a forerunner of research done by students. The teacher-demonstration, occurring at step 2, aids students to gather ideas on the necessary means for testing or solving their problems. The demonstration follows the evidence of interest in a difficulty and the definition of the problem, but it usually precedes the actual solving of the problem in the laboratory or classroom. The demonstration by a teacher, then, is a means for students to gain information about the workings of a piece of equipment—how, for instance, to use a microscope in biology, or how to cut and bend glass tubing in chemistry; the development of a skill—how to form a difficult sound in French, how to add a column of figures, using ten as a base, in mathematics; or finally the accomplishment of a necessary feat—how to draw a graph, or how to stand up straight. Dale says the demonstration is "frequently a process of observing."⁵ For this reason, the teacher may need to repeat a demonstration when he discovers that students' observations have failed to earn for them the needed information or skill.

Every talented teacher employs demonstrations as a technic for helping students to understand how to go about solving problems. At this step the demonstration may be a brief three-minute illustration of necessary precautions to be observed in dealing with an acid. It may be the pulling together of ideas by use of chalkboards, such as demonstrating how to solve a geometry problem. At step 3 the demonstration may become a more formal presentation. Because of expense and limited supply of equipment, or perhaps because certain operations are too dangerous for pupils to perform, the teacher may demonstrate or actually perform a test. The student, then, would assume the role of observer and recorder.

A teacher demonstration may be carefully planned, or it may take place spontaneously as the students reach a point in thinking where explanations are needed. In any class the teacher may turn to his closet or desk and pick out an object to demonstrate to students how to solve a problem. One teacher attached a piece of chalk to the rim of a wheel; he moved the wheel across the chalk tray so that the chalk

⁵ Edgar Dale, *Audio-visual Methods in Teaching*, The Dryden Press, Inc., New York, 1954, p. 138.

traced a path along the blackboard, thus showing students how to gain information about the tools necessary to solve problems concerned with the locus of a point in a plane at a given distance from a given point.

The formal demonstration at step 3 must be planned more carefully. In a way it is dramatic in nature. The demonstration is correlated with the class problem; materials and supplies are arranged before class; comments by the teacher add ideas as the demonstration unfolds before the pupils. Opportunity is offered to the students to question, record procedures, and make diagrams when necessary. Afterward, the class will have a chance to discuss the demonstration and, if necessary, to witness a repetition. Thus the teacher demonstration generally purposes to help students discover how to do something. It may be used at step 3, though as rarely as possible, as a substitute for pupil participation where facilities and equipment are limited.

Sources of Materials

Thus far in our discussion our comments have applied, wherever possible, to all aids. We have given examples but have avoided classifying the many types. To the beginning teacher an understanding of the scope of multisensory materials available seems necessary, and here we shall classify the more popular aids, with brief comments about each to show its uses and limitations in the classroom. For clarity, we have divided our materials into two categories. Category 1 lists those materials that are commercially manufactured. They are usually electronic and expensive; they would be listed as capital expenditures in school budgets. Category 2 lists those materials that are relatively inexpensive or free and depend on the teacher's awareness of available sources and his ingenuity more than upon availability of school money. We have also offered a list of possible resources for obtaining the aids.

Category 1—Commercially Manufactured Equipment

Sixteen-millimeter Sound Motion Picture Projectors. This projector is an expensive and heavy piece of equipment to handle unless schools provide rolling tables to move it about the building. Film is expensive

to own, and rentals must be scheduled some time in advance of showing. Industrial films, promotional films put out by travel agencies, and films made by educational organizations may be obtained for most subjects and topics in school curricula. Training is necessary for operation and maintenance of projectors. A fairly dark room is recommended. A new model has a screen, similar to a television screen, attached to the projector, so that the room does not need to be darkened. Since mechanical breakdowns may occur, some knowledge of maintenance is essential.

Filmstrip Projectors. The filmstrip projector is an inexpensive piece of equipment, light enough for anyone to carry. Many new schools provide one for each classroom. The projector is easy to operate and maintain. It may be used for 35 mm. stripfilm (usually 25 to 100 scenes per strip); the film may be synchronized with recordings, producing a sound filmstrip. Colored slides may also be used in the projector. There is an attachment called a tachistoscope, which permits timing of the projection on the screen of from 1 to 1/100 of a second. This attachment may be used for reading, spelling, and arithmetic. Teachers may project a scene on the screen for as long as desired. A second showing may be accomplished with little difficulty. Filmstrips are inexpensive; they are not damaged easily; they may be stored in desk drawers; they cover practically every aspect of school work from preschool through college. Teachers often own their own film-strips and slides.

Opaque Projectors. The opaque projector is heavy, bulky, and expensive. Basically, it is designed to project, on a wall or screen, mounted or unmounted pictures such as postcards, pages from books, flat specimens, and samples of student work, such as a theme or poem. Since teachers may project pages from their personal books, the projector has many practical uses. An attachment for slides is usually provided with this type of projector. A fairly dark room is essential.

Other Projectors. Microprojectors project microscopic slides onto screens or table tops, or project images of living microorganisms in liquid onto a wall screen. There is also a microbeam attachment for slide-film projectors which accomplishes the same function as the microprojector.

The over-the-shoulder projector permits the teacher to face the class at all times when projecting slides or drawings. The teacher may

sketch or figure on clear acetate as he conducts the class, and the images or figures will project behind him onto a wall screen. Many teachers use this projector in preference to blackboards.

Recorders and Record Players. The magnetic tape recorder is probably the most popular recording instrument in use today. It is relatively expensive and heavy to carry but not difficult to run. It may be used to record radio and assembly programs, class discussions, and individual voices in speech, language, and English classes. Wire and disk recorders are available, but have less versatility than the tape recorder. The tape recorder plays back what it records, and tapes may be used over and over.

Record players come in varied speed combinations and will play records at such standard speeds as 78, 45, or $33\frac{1}{3}$ r.p.m. Prices vary considerably, but a high-quality record player is not expensive; many teachers own their own. Records are available for use in practically every class in secondary school. Recorded plays and stories for English and languages, lectures by experts on academic subjects, music for appreciation classes, and commentaries on filmstrips are instruments for assisting teachers to promote understanding.

Radio and Television. Radio has achieved little success in schools. Probably the programs have not been designed for youth or timed for school use. School-sponsored radio stations with local programs have been more popular than commercial programs.

Although television is in its infancy, indications are that it will achieve more success as a teaching aid than radio. Programs sponsored by industry of a cultural and historical nature, classical plays and musicals, and travel shows have already attracted large audiences among teen-agers. Many educational television stations are producing programs for direct classroom use and provide guides for the teacher to use as he and his class prepare for and watch a production. Teachers should guide their classes in out-of-school selections and should encourage them to watch programs that may fit into classroom activities. Educational television stations are also offering the teacher new sources of information and ideas and will probably offer more in the years ahead. The use of television in school often involves the same problem as radio; i.e., programs during school hours are not educational. Teachers should keep up to date on day-to-day advances in television programs for education.

Category 2—Inexpensive or Free Materials

Maps, Charts, Pictures. Most classrooms should be supplied with sufficient wall or pull-down maps. Teachers often complain that maps are not available, but certain kinds of maps and charts may be purchased inexpensively. Political maps may be clipped from newspapers and periodicals. Schools may subscribe to weekly news maps. One teacher procured thirty road maps from a local gasoline station for use in his geography class. *National Geographic* maps are excellent for classroom use. Every teacher should be able to procure maps without very much expense.

Charts for use in biology, chemistry, physics, and mathematics, in English and language classes, are available in many forms. They can be made by teachers and pupils at little or no expense. The beautiful commercial charts have a place also, but students learn a good deal when they draw their own charts and diagrams.

Pictures come in so many varieties, that teachers should use them far more than they do. Every teacher should keep a scrapbook of pictures, charts, and maps which he finds in popular periodicals or on trips. We wonder how many teachers use their cameras for educational purposes. A trip recorded on colored slides makes learning really personal to students.

Chalkboards and Tackboards or Bulletin Boards. The slate was one of the early visual aids used in this country. Modern school designers are trying to replace the chalkboard (which is a form of slate) with the tackboard, and are meeting strong criticisms from teachers. The tackboard has a place for notices, news and events of interest, pictures, and exhibits by students, but it has not the flexibility of the chalkboard. Teachers should use their chalkboards frequently to summarize discussions and to diagram difficult situations. They should encourage students to use them to help other members of the class. Problems can be outlined on the chalkboard better than in any other way. Recently magnetic boards have appeared on the market on which metal objects will remain in place indefinitely. The tackboard cannot be erased, and thus material cannot be replaced as quickly as on the slate. But the tackboard has its special place, and since it is educational, it should be esthetically attractive, frequently changed, and should serve a definite purpose.

Books and Magazines. Visual materials in books and magazines may be extremely helpful. *Life*, the *National Geographic Magazine*, the *Scientific Monthly*, for example, are magazines which offer exceptional visual material. Many encyclopedias and reference books, especially on science and nature, need to be available in the classroom.

Field Trips. A field trip makes learning lifelike. It makes the community the classroom, and it uses several of the senses. It gives pupils the opportunity to become more fully aware of the world around them. The student may observe industrial processes; he may visit places of historical significance mentioned in other references; and he may examine museum collections that otherwise he could only read about. The field trip presupposes organization by the teacher and class. Questions such as the following should be considered: What should we look for? Can we get school time for the trip? How can we pay for the trip? Who will make the necessary arrangements for the success of the trip? As for the teacher, what legal responsibilities does he have for the safety of the young people? For a discussion of the legal aspects of a field trip, see an article in *The Nation's Schools*.⁶ A field trip is not a vacation for the student. It is as much a learning experience as is any formal class. The field trip is one way of personalizing a learning activity in terms of the pupil's immediate environment.

Other Materials. A comprehensive list of aids by Schorling and Batchelder includes, in addition to those already mentioned, the following: apparatus, aquarium, cartographic map, cartoon, carving, collection, cutaway, demonstration, diagram, diorama, dramatization, drawing, flannel or felt board, globe, mock-up, model, painting, postcard, poster, print, sand table, school museum, specimen, stereoscope and stereograph, time line, writing.⁷

Multisensory Resources

We list here suggestions of resources for possible use in each teacher's local community.

Local Resources in a Given School. The teacher should contact the

⁶ Lee O. Garber, "Field Trips and Excursions," *The Nation's Schools*, vol. 56, pp. 82-85, September, 1955.

⁷ Raleigh Schorling and Howard T. Batchelder, *Student Teaching in the Secondary School*, McGraw-Hill Book Company, Inc., New York, 1956, p. 255.

audio-visual director, the superintendent, or principal, for lists of materials.

Local Libraries and Museums. These would be listed in the telephone book and in chamber-of-commerce publications.

Major Industries. Their multisensory aids available to the public could be obtained through a contact with the public relations director.

Social and Civic Organizations. The chamber of commerce should have a directory to local organizations. Otherwise, contacting one group should offer ways of finding others.

State Departments of Education. Teachers should write to the director of audio-visual aids.

Universities and Colleges. Teachers should make contact with the director of audio-visual aids or the chairman of the department of education or the dean of the college of education.

Commercial Film Distributors and School Suppliers. The yellow pages of the telephone book should indicate local merchants and distributors. Professional journals list addresses of national distributors.

Professional Journals. The teacher should read professional journals which are not too technical and which pertain to his particular field. The advertisements or specially prepared lists offer many leads to multisensory materials. A list of all professional journals in education in the United States is available from the Educational Press Association of America, 1201 Sixteenth Street Northwest, Washington 6, D.C., priced at \$2.50.

U.S. Government. The United States Government Printing Office distributes many free and inexpensive pamphlets and books suggesting ideas about multisensory material for teachers at all levels. Much research on teaching facilities and curricula carried on by the Office of Education has been published. For a catalogue of publications on education write to: Superintendent of Documents, Government Printing Office, Washington 25, D.C.

Others. Other sources are available in the books and periodicals the teacher reads, in the experiences which he encounters. Exhibits constructed or arranged by students and teachers may be taken from collections and materials already in their possession. Persons in the community may be able to offer materials which they have collected or with which they have some special skill.

Other Views

Again we offer the words of other writers, in the form of condensation of articles, in the hope that they may add to information already presented and that they may lead the reader to more and better-founded learning. The ideas may not agree with those already written, but the reader should be offered the opportunity to make a choice.

Aids to Writing. Writing a paper may be a more significant experience if audio-visual aids are used. They would include the blackboard, on which to list ideas which come from class discussion; slide projectors and opaque projectors to start discussions; and also filmstrips, motion pictures, maps, and globes. Writing of compositions should immediately follow class discussions. Finally, the opaque projector could be used in correcting compositions.⁸

Listening. Newton, Massachusetts, High School has introduced an aid called a vocarium, a record player equipped with from one to six detachable headphones. This aid is used in teaching Latin, modern languages, spelling, speech, and literature. The vocariums are located in the library, away from distractions, where browsers and students with specific assignments may select records from the school recording library. The material for making a vocarium is a transcription player with a jack for an extension speaker.⁹

Pictures. In order to visualize a distant land, students must transport themselves in imagination into the area; pictures provide the means. Pictures for this purpose may be classified as follows: those typical of a region, those of human interest or of value in showing natural environment, those of little or no geographic value but possibly illustrating some foreign culture. The picture should be chosen in terms of the particular function it can perform in bringing a student to effective understanding of geography. It should be used briefly as it makes its contribution, then used again later to make a new contribution.¹⁰

⁸ Amy Glazier, "Use of Audio-visual Aids in Twelfth Grade Composition," *Journal of Education*, a publication of the Boston University School of Education, vol. 137, pp. 14-16, December, 1954.

⁹ Henry S. Bissex, "Learn by Listening," *Massachusetts Teacher*, vol. 33, pp. 8-9, November, 1953.

¹⁰ Marguerite Logan, "Pictures as Geographic Tools," *NEA Journal*, vol. 39, pp. 44-46, January, 1950.

Tape for Teaching. Practical uses of the tape recorder include drawing out the timid students and increasing participation, teaching phonics of foreign languages, recording important radio programs for future use, recording examples of individuals' performances for purposes of self-criticism and analysis, and providing media for dramatizations. The advantages of a tape recorder are its small expense, its accurate sound reproduction, its light weight, and the availability for instruction of relatively new recorded material.¹¹

Chalkboard. The social studies teacher may use the board for various purposes: to organize thinking through outlines; to organize plans for units or committee work; to help in the pooling of ideas; to develop relationships, for example, by use of time lines; to give immediate explanations or examples; to list alternatives for a class choice. Some rules need to be followed, among them to be neat and versatile. The teacher should allow the students to use the board, and all work should be carefully checked.¹²

Several Aids. Audio-visual materials are actual, practical, substantial, and of matter; mathematics is unsubstantial, imaginative, thoughtful, intellectual, and of mind. How can they ever get together? Recordings may be made of a play written by the class concerning the moneys used today in various countries. Posters may be displayed to illustrate the sources of funds and the expenditures for services of charitable organizations like Red Cross or Red Feather; here the students become aware of the unbiased nature of pure statistics. Charts show relative sizes of areas; models illustrate the third dimension; pictures illustrate the shapes of geometry or show other mathematical shapes. Commercial models and movies are available, as are radio and television programs.¹³

* * *

Multisensory aids, then, do not teach for the teacher; the multisensory technic is only a technic to be utilized as part of problem solving and critical thinking. Unrelated, the aids have little value;

¹¹ Ronald R. Lowdermilk, "Teaching with Tape," *School Life*, vol. 35, pp. 44-45, December, 1952.

¹² Sam Duker, "Making the Most of the Chalkboard," *Social Education*, vol. 20, pp. 21-22, January, 1956.

¹³ Henry W. Syer, "Making Mathematics Sensible," *NEA Journal*, vol. 43, pp. 221-223, April, 1954.

they do not stand alone. But they have obvious intrinsic value for promoting thinking, at the early felt-need step, and in a limited way in steps 2, 3, and 4. *Life* and some other magazines have exploited the picturing of ideas. So, of course, have movies and television, with the addition of the auditory medium. Hearing, seeing, touching, visualizing, all add breadth and scope to interest and thinking, and obviously people learn as a result of this new dimension. All of our knowledge comes from the senses, and experience of things is our teacher; much remains obscure to children, wrote Basedow, simply because they have not seen or heard it. But the students in the classroom must see, hear, touch, visualize in relation to a real problem if productive thinking rather than unthinking enjoyment is to be the result. And then students must stop to evaluate the solutions of their problems in order to evaluate the aids.

Research indicates that young people learn from television—the technic of crime, for example. But this is thoughtless, unconsidered learning (the unrelated bits of information already considered). Because it is unconsidered, it may run the gamut from being useless to being very dangerous. Only when the multisensory material is carefully adjudged in its proper perspective does thinking take place, and thinking means the ability to discriminate carefully. Then the technic becomes a resource of value.

This book is obviously not an auditory aid; it is visual, in attractive format, with a few illustrations added. All books are designed to present words, which are symbols of meaning in themselves and take on significance in combination. Some visual aids may be incorporated, but they are often lifeless as compared with the stirring aids available for the personal interchange of ideas.

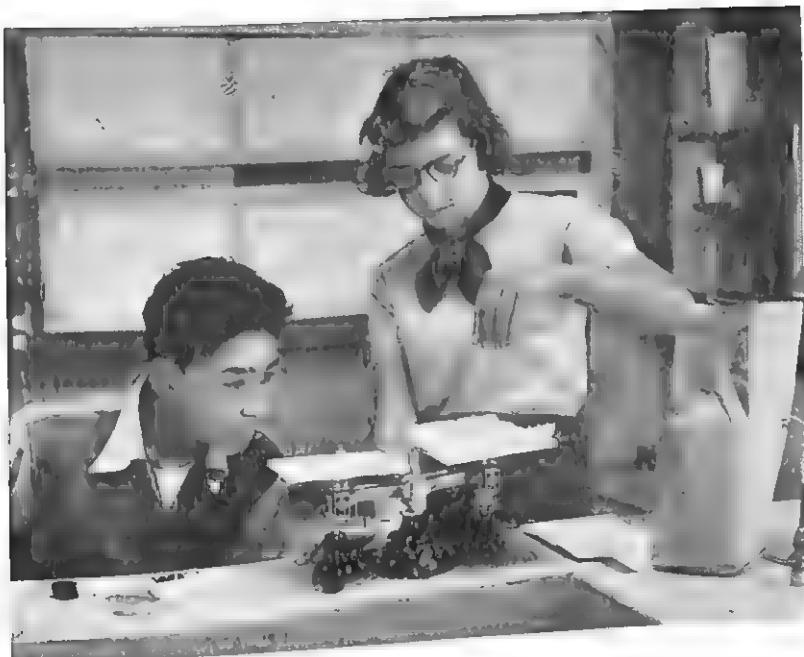
We hope that the reader has considered carefully the place of the multisensory technic in his own method. He is probably aware that it is a vital technic for enhancing learning when used by the talented teacher. If the reader has considered possible new sources for collecting his own aids, if he is aware of the planning necessary for using aids and of their contribution to problem solving, if he has considered the many available aids and the particular kinds likely to be valuable to him, then he not only is thinking but is thinking clearly and placing this new information in its proper place in relation to his previous learning.

LEARNING MATERIALS

*Suggestions for Further Reading**

1. Dale, Edgar: *Audio-visual Methods in Teaching*, The Dryden Press, Inc., New York, 1954.
2. Kinder, James S.: *Audio-visual Materials and Techniques*, American Book Company, New York, 1950.

* See also the summaries under *Other Views* in this chapter. See also the list following Chapter 11.



8

The Laboratory Technic

"I had assigned to me a small pine table with a rusty tin pan upon it. When I sat me down before my tin pan, Agassiz brought me a small fish, placing it before me with the rather stern requirement that I should study it." Thus Shaler begins his description of his experience in Agassiz's laboratory. In an hour Shaler thought he had found out all, but Agassiz spoke not a word to him for seven days. At the end of this time he asked for Shaler's findings. Dissatisfied, Agassiz put his pupil back to the task for another week.¹

The student possesses the ability to discover and needs to discover many kinds of information and attitudes for himself. Most students require somewhat more direction than Agassiz offered, that is, help and

¹ *Autobiography of Nathaniel Southgate Shaler*, Houghton Mifflin Company, Boston, 1907, pp. 93-100.

suggestion which is aimed toward the technic of discovery, not toward defining the results to be discovered. Here lies the essence of the laboratory technic. The laboratory approach is a process whereby students work out solutions to their problems (at step 3 of problem solving) through research and experimentation with tools of learning such as experimental apparatus and multisensory aids. Sometimes it involves a student demonstration which moves into step 4.

Historically, after the days when Francis Bacon's alert mind began investigations, the laboratory became known as the workroom of a chemist, hence a place devoted to experimental study in science or to the testing and analysis of materials. In years past, educators limited the laboratory technic to the sciences. Recent experiments with use of multisensory aids, plus a learn-by-doing philosophy, have enlarged the scope of this technic so that it encompasses nearly every academic and practical art subject in the curriculum which may conceivably involve research and experimentation. The term is applied to special-research projects, such as a play or the construction of models in English, speech, drama, and foreign languages; to research projects in history, mathematics, and English; to experimental pursuits in the sciences; and to the more practical aspects of home economics, business, and vocational arts. A laboratory in English, for instance, might involve opportunities for students to attempt to express in verse an idea which has been already treated by a famous poet, and then to compare the results. For example after writing a poem on autumn, they might read Keats's "To Autumn." In whatever field the laboratory takes place, the student must search for the solution to his problem by doing something without predetermined results.

The laboratory in a physical sense is any of the following: the science laboratories with laboratory tables piped for gas, water, and electricity, plus other equipment and specimens necessary to research; the English laboratory for research in writing and speaking with aids such as recorders and opaque projectors; a social studies room with reference books, maps, charts, films, and projectors for research activities; art and home economics rooms with the profuse amount of equipment always necessary to these studies; the mechanics shop with its automobile and special tools for experimental study. Rousseau said in *Emile*: "Undoubtedly we derive much clearer and more accurate notions of things which we learn for ourselves than of those which we

gather from the instruction of others." It is upon such a concept that the laboratory is founded.

John Dewey also indicated the need for student involvement when he said, "Doing is of such a nature as to demand thinking, or the intentional noting of connections; learning naturally results."² During research it is imperative that, wherever possible, students actually *do* the investigating, better, as Shaler did, without help than not at all. They must discover what happens to litmus paper, where *y* changes to *i* adding *es*, why an election takes a long time, how a French *é* sound differs from English *ay*.

The Laboratory Technic and Problem Solving

The laboratory technic, since it involves experimentation, research, testing, and analyzing, is the most common technic, beside reading, for accomplishing the third phase of problem solving. The teacher stimulates the students to feel their difficulties or problems and then, through discussion and other technics, helps them to define their questions in specific terms. While in the defining stage, the class determines how best to attack or solve their problem within limits of available classroom resources. Many teachers use the term laboratory to include research and experimentation done outside the classroom. For example, students might work at home or in the community; they might help in the development of science-fair projects; or they might study social institutions, such as a town or city government. We have classified such activities under field trips, in the chapter on multi-sensory aids. Work to be done at home by students should follow closely classroom activities and be a part of most of the phases of critical thinking.

When the third stage is reached, the class is ready to experiment, test, and analyze problems through a "work approach" or laboratory technic, that is, they are ready, as some writers describe it, to apply the experimental method.³ In a geometry class the students have just been introduced to circles. They discuss a rotary traffic circle on a

² John Dewey, *Democracy and Education*, The Macmillan Company, New York, 1916, p. 181.

³ Lindley J. Stiles and Mattie F. Dorsey, *Democratic Teaching in Secondary Schools*, J. B. Lippincott Company, Philadelphia, 1950, p. 83.

superhighway, a subject which touches their need for safety. They consider also various examples of architecture in their homes and towns where circular forms are used. Perhaps, by chance, some young person may be dreaming of a circular swimming pool illustrated in a home magazine. Of course, unless the students have already mentioned it, the teacher introduces the subject of the wheel. This discussion of the uses of circles makes it possible for students to feel the importance of circles in their lives. They consider physical comforts provided by the invention of the wheel, safety assured by curved surfaces in automobile and road designs, and future success as they visualize their future home.

By this time many members of the class feel some anxieties about the circle. The teacher mentions its construction and measurement. He helps them to phrase questions, and they decide to learn first how to construct circles. As their first experience with construction of circles in the laboratory, some students work on the theorem found in their book that "through any three points not in a straight line, one circle, and only one, can be drawn." The students decide to use their compasses and rules and to attempt to draw circles through any three points not in a straight line. The teacher helps other small groups to work on other approaches to their problem. When everyone in the class has formed hypotheses, the teacher leads the class into a discussion and analysis of their findings (step 4). Similar problems needing special testing then follow in similar laboratory experiences. The essence of the laboratory approach is to offer the student opportunity to do basic research himself, with an emphasis on his own involvement in the search for results.

Considerations for the Laboratory

Assuming that anxiety has been aroused in as many students as possible, and that the problem and its kind of solution has been understood, the teacher must first consider the differences in background, ability, and desire of each student who is to pursue the laboratory.

Mr. S's second-year art class engaged in a discussion of how to draw the human figure. Mr. S asked if anyone had ever attempted such a drawing. Jane and Charles raised their hands. He asked them about their attempts. Jane said, "I drew the head fine, but couldn't

make the body in proportion." Charles stated that his drawings never looked like real people. Other students expressed further concerns.

Then Mr. S asked Bob to act as a model. He asked, "How would you start to draw Bob? Can you show his personality in a drawing?"

Raymond said, "Why not let us just start in and see how we draw Bob? Then you can help us individually if we seem to get lost."

The class then defined their problem: "How do we draw this figure?" Their way of approach, they said, was "To try to draw it as we see it."

Mr. S walked around the class, helping individuals and occasionally calling the group's attention to some special aspect of the pose, such as Bob's crossed arms or the cant of his left shoulder. When he came to Diane's desk, he discovered nothing on her paper.

"What seems to be the trouble, Diane? Can't you get started? Or don't you see what we are trying to do today?"

"No, I don't care much about sketching people. I like art when it comes to painting landscapes and designing clothes, but this doesn't appeal to me."

Mr. S had noted that Diane always wanted her work as perfect as possible. As he considered her ability and background, he tried to find clues to her feelings and then tried to reflect them.

"You feel you can't do this kind of drawing though you have talent in other lines?"

"Yes, I wish I could but—"

"You don't want to try?"

When she made no response, Mr. S suggested that she walk around and look at some of the work of her classmates for ideas on how to begin. When Diane returned to her seat, he helped her to proportion the body, and he mentioned that art work in merchandising and advertising often starts with the human figure. With this help, Diane made her first attempt to draw from the model.

The rest of the group found many individual problems on this first day's attempt. Some needed further information; some wanted to know how to get started, or how to proportion the various parts of the drawing. Mr. S had taken a group of young people with different backgrounds, abilities, and desires; he had helped them to discover a problem and the way to solve it; finally, he had helped them to use the laboratory for experimentation. The students spent a few days more in the laboratory, drawing other boys and girls from the class and

working on the various individual problems as they were defined. Thus Mr. S had met the demands of students on various levels of ability.

The second consideration for the teacher is the manner in which the laboratory may promote coalescence of student need with teacher aim for thinking. Because the laboratory is often an individual process, the teacher must not assume that coalescence fails to occur. It will be inevitable in an atmosphere of mutual respect. Students realize that they seek answers to a common problem or to a similar and related subproblem. They feel, therefore, a sense of cooperation in their united efforts. Furthermore, the teacher helps each student—Bart, as he worries over a dissected frog, and Andy, as he works at a rolled French *r*, and Kathy, as she draws a map—to recognize that the doing is as important as any final result the boy or girl may achieve.

The laboratory effects the coalescence of student need with teacher aim by leading students from their new anxieties and resultant problems to fresh information, ideas, findings, and tools, which provide them with a basis for forming conclusions. Bart's dissected frog helps him to form hypotheses about bones and muscles; Andy's search helps him to gain a tool which he will apply in solving his problem in French pronunciation; Kathy's experience in map making leads her to hypotheses about geography or history which a book could not offer. The laboratory may be the vital bridge between anxiety and critical judgments.

The third consideration for teachers and students in using the laboratory is the manner in which discoveries are to be reported. Laboratory results should often be recorded by the student in a report, either oral or written, which may be utilized at step 4. One purpose of the laboratory is to teach pupils to be accurate in their approaches and observations. When they write down procedures, as well as resulting hypotheses and judgments, accuracy is encouraged and the whole process is emphasized. When reports are written and not presented orally, the teacher should make written comments. In science classes, or in other classes where a more formal report is decided upon at step 2, one of the first responsibilities of the teacher is to help pupils to write such reports. One part should describe the problem, materials used, and means of attack; another part should present a commentary on both process and results, perhaps including illustrative diagrams, charts, and graphs; the concluding section should evaluate findings in the light of the statement of the original problem. After

this step, the student may move on to a class demonstration of his approach and his conclusions.

The result of laboratory work in social sciences and English may be requested in written form, but may be disseminated to the class through individual or group oral reports. Students should report their evaluations of laboratory work undertaken in such areas as mathematics, writing, and speaking. In studies other than science, a more informal type of report is generally needed. Students in an English laboratory might, for example, decide to dramatize a part of *David Copperfield* in an attempt to understand better both the characters and the ideas suggested by Dickens. They agree to take Chapter 3, "I Have a Change," and act, first, David's visit to Peggotty's beach home. They plan to read their lines, improvising where changes in scenery must be explained. Several students volunteer to take part in this first acting attempt, and they choose the parts of David, Ham, Peggotty, Mr. Peggotty, Emily, and Mrs. Gummidge. After the presentations, all students write informal reports about the dramatization. Those who acted discuss what they learned about the characters and Dickens's ideas (the problem which the class named) in a somewhat different manner from those who observed. Jess, who played David, wrote, "I learned particularly that David was just a bit nosey, prying into everyone's affairs early in his visit." Leigh, who had been an observer, wrote of David, "He didn't act like a little boy, more like someone who knows a lot." These reports may later be discussed by all the students in one large group, by which means the different approaches may contribute to more constructive thinking.

Student preparation is a final consideration. The student, with teacher's and classmates' help, decides at step 2 (the means for proceeding) what aspect of the problem he wishes to pursue during the laboratory period, taking care to appraise its relation to the total problem of the class. The student may also study background information; he may gather facts and opinions from material made available to him by the teacher; or he may investigate outside, where such activity is feasible. Preferably, given basic materials, he puts them together himself and works out the apparatus necessary for the laboratory research.

Dick's science class is to study leaves in the laboratory. The class has discussed the value of classifications, and they state their problem as, "How can we find out about trees?" The class decides they ought to know something about trees—how to care for them, which ones

will grow well in local areas, how they can beautify surroundings, including home and civic areas. The purpose of this laboratory is to study various common trees in the community. As a first step each student agrees to read reference sources in a book and to bring to class the following day at least five different kinds of leaves. Here the preparation by the student involves defining the problem and the method for its solution as well as some reading and gathering of materials. The actual laboratory will take place in the classroom as the group studies the leaves. With the teacher's help, the students may then organize the laboratory materials, such as knives, microscopes, and the like.

Let us suppose that the class members in general seem unwilling to play their parts in the laboratory. Perhaps the students do not bring the material to class. As usual in such situations, the teacher would stop to reflect feeling.

"You felt finding the leaves was quite a bit of trouble. Now we have only a few kinds for comparison. What shall we do next?"

Class members muttered to themselves.

The teacher continued, "Let's try to find out why you didn't bring the material." He waited and finally began to get some replies. These he accepted.

"Do you feel this study isn't important enough, or shall we continue it until tomorrow?"

Generally such understanding from the teacher will prompt many students to greater efforts.

Conducting the Laboratory

The teacher is like the foreman in an industrial plant, interested in accomplishing a given operation under efficient conditions with concern for methods of operation and for his workers' safety. His laboratory, to be well administered, pays heed to safety and efficient operation in general, and also to the actions and progress of each individual class member.⁴ The teacher, like the foreman, does not work for the students; as Schorling points out, his role is to guide and assist.⁵

⁴ Arthur G. Hoff, *Secondary School Science Teaching*, McGraw-Hill Book Company, Inc., Blakiston Division, New York, 1950, p. 174.

⁵ Raleigh Schorling and Howard T. Batchelder, *Student Teaching in Secondary Schools*, McGraw-Hill Book Company, Inc., New York, 1956, p. 172.

In any educational laboratory, whether in sciences, humanities, or practical arts, organization is the primary consideration. Who is to be responsible for necessary equipment and supplies, and to whom will he be accountable? How can the typical classroom be physically arranged for laboratory work? When do students need basic instruction in operation of equipment and in safety? The teacher is accountable to his superiors for equipment, and he ascertains that everything used for laboratory work which is not expendable is handled with proper techniques. In many science laboratories, inexpensive equipment is assigned to individuals for the year; they sign for it as the worker in industry signs when he borrows tools from a tool cage. This habit should carry over into college laboratories and industrial plants.

The second thing to consider in organization is how to instruct students in the use of materials. Expensive equipment like microscopes, projectors, and scales are used when needed with careful explanation beforehand by the teacher. Before dangerous supplies such as chemicals, knives, or burners are handled, the teacher again demonstrates their proper operation. Pupils may make use of everything in the laboratory, if the supply is sufficient, and if teachers will observe each student as he first uses expensive or dangerous equipment, to guide him away from fumbling, into proper methods.

Teachers, especially those conducting science and practical or home arts courses, might investigate the purchase of a liability insurance policy to cover them in case of a suit brought by a parent for injury incurred by a student while in the classroom, laboratory, or workshop. A comprehensive liability policy on a home, with a rider attached to cover the teacher in any classroom situation, costs less than \$20 a year.

When supplies and equipment are limited, the teacher or a pupil will have to deliver a demonstration or conduct a test for the entire class. Some writers claim that a good teacher demonstration is as effective as pupil experience,⁶ especially if time and money must be considered. However, according to one researcher, if students merely watch and listen, we can be assured only that they will gain facts as in a lecture.⁷

⁶ J. G. Umstattd, *Secondary School Teaching*, Ginn & Company, Boston, 1953, p. 313.

⁷ Richard W. Husband, "A Statistical Comparison of the Efficiency of Large Lecture versus Small Recitation Sections upon Achievement in General Psychology," *Journal of Psychology*, vol. 31, pp. 297-300, April, 1951.

The third problem in organization concerns the physical conditions in the classroom. A room with screwed-down desks, no multisensory aids, and few books other than a general textbook creates a poor laboratory atmosphere. Flexible work space allows individuals or small groups to study and experiment without being cramped. In a workable laboratory, resource materials, such as encyclopedias, almanacs, pamphlets, magazines, and other references, stand available and catalogued. Multisensory aids which may assist the students are conveniently located. Such items as recorders, projectors, microscopes, models, maps, are within reach at all times so that when students define a need for them at step 2, the materials are easily obtainable. Expendable supplies such as plain, lined, or squared paper, paste, specimens, chemicals, or standardized tests have been inventoried before the laboratory period.

We need to say little of the physical organization for the sciences, since most laboratories are planned around tables fitted with utilities. Nevertheless, many biology laboratories lack aquariums, small greenhouses, and living specimens. The teacher can transform his room into a workroom. He can obtain tables and bookcases through supply channels or perhaps from the custodian. He can build his reference library by borrowing from his personal collection and from the school and public library. He can encourage students to collect used magazines, maps, or props, and to borrow other items, and he can watch for offers of free posters and resource material in the community and industry.

In history the students might work out a mock election in the laboratory. They would need, in addition to reference material, cardboard for signs, a special arrangement of chairs, and a portable microphone. In English the students might construct big posters depicting the environment of great writers in the era of Queen Elizabeth I of England. Talented art students would need paint and poster paper, crayons and art materials. Others would need old magazines, scissors, and paste.

In French students might put on a play in French, or act out a scene of the meeting of friends. They would need simple props. In mathematics students might demonstrate equations or problems with balance scales or geometric shapes. Always the care and use of equipment is predefined carefully. The teacher conducts a laboratory with forethought and constant attention to organization and equipment, to the

need for demonstration, and to carefully prepared physical surroundings.

Special Laboratories

Although the approach to the laboratory is the same whether the course is physics or English, some differences in practice exist. We turn, therefore, to special laboratories, classifying them according to course areas.

Science Laboratories. A student said recently of her study of chemistry, "I have taken chemistry courses in high school and college, and the laboratories for most of them have been nothing but cookbook exercises. The quicker you work, the sooner you get out, and the less you know. The reason is that most of us know what is going to happen and why. We have gone through the mechanics of experiments so often that we are bored." Nechamkin, in discussing this point, adds, "A primary function of the chemistry laboratory is to encourage impartial observation and the recording of facts."⁸ We are prompted to consider, therefore, the relationship of critical thinking to the scientific method.

Problem solving and the scientific method are closely related. In the science laboratory the student utilizes scientific apparatus, specimens, and other experimental supplies. Thinking must take place in a laboratory as the student engages in research. Following prescribed outlines and manuals seldom calls for real thinking. For example, a chemistry class may study the preparation of oxygen in the laboratory. Their textbooks or manuals present them with a picture of the laboratory apparatus needed and the chemicals that must be burned to obtain oxygen. The students set up the apparatus, apply heat to the chemical, and collect oxygen. The book or teacher then informs them that a test for oxygen is that a glowing splinter placed in the gas will brighten when inserted. The student diagrams his experiment in his notebook and writes that oxygen was produced because the lighted splinter glowed when inserted. This paper earns an A. Perhaps learning, other than how to finish quickly, included the knowledge of how to handle the apparatus and the information that oxygen causes fire to burn brightly. Neither problem solving nor learning about the scientific

⁸ Howard Nechamkin, "Laboratory Meetings Should Teach Too," *Journal of Chemical Education*, vol. 29, pp. 92-94, February, 1952.

method has been involved. If one aim of laboratory work is to teach students the scientific method so that they may truly discover results, teachers of science courses must use and understand the methods of scientific investigation. The steps of the scientific method follow those of problem solving. That is, once the problem has been raised and defined by the class, the steps of problem solving and the steps of the scientific method are the same. The scientific method involves collecting and organizing data, making and verifying generalizations under laboratory conditions, and finally reporting results as in steps 4 and 5 of problem solving.

Let us apply the scientific method to the problem of making oxygen. Students and teacher have discussed oxygen—how it aids life, and how it may be produced. The teacher may suggest, “Oxygen may be produced by artificial means. How do you suppose hospitals and industry do it? Here in class we can actually use various means so that you can see the properties of this gas, and understand why it is so valuable to us for health and for other reasons.” The students then define their problem, “How can we produce oxygen here, and could what we produce be of any value?” Next they decide upon the process of experimentation.

At this point the scientific method begins with the organizing and collecting of data. The members of the class study their books and also reference books available from the teacher, to discover how to go about the solution of the problem. They suggest several methods, realizing that they must find out whether, for each method, equipment is available to permit experimentation. They decide upon five procedures. At the first part of the scientific method, then, the students have collected and organized data; they have gathered together necessary equipment.

Some students might suggest that oxygen can be produced by heating potassium chlorate and collecting the gas in inverted bottles placed in water. Others might report that oxygen can be made in the laboratory by heating silver oxide, barium dioxide, or potassium nitrate. Still others in the class might have read about the action of water on sodium peroxide and want to test this approach. These suggestions are the generalizations which constitute the second part of the scientific method.

After these generalizations have been offered and recorded by the

class, verification of them is necessary. This is the third part of the scientific method. Here the students enter the laboratory, check out such equipment and chemicals as they need, and attempt to verify their generalizations. They record procedures and findings, using written explanations and diagrams, with the purpose of explaining both approach and results to others. Still following the scientific method, the class moves to step 4 to report results of problem solving. They discuss difficulties met during experimentation, the ease of preparing oxygen, reasons why a certain procedure would be effective or ineffective to prepare industrial oxygen, and tests to verify the product as oxygen. The pupils learn information as did the students in the situation previously described, but they also experience the scientific approach, with emphasis on this process as they pursue problem solving.

A study by Degering and Remmers emphasizes some of these aspects of student laboratory practice, even though the findings appear in one way somewhat negative. They conducted a study over a two-year period at Purdue University with organic chemistry classes and concluded: "So far as these groups were concerned, the lecture-demonstration method is as effective as the regular laboratory method for the teaching of theoretical organic chemistry. . . . If one wishes to teach laboratory technique, obviously enough, laboratory instruction is essential."⁹

Humanities Laboratories. Laboratory activities in the humanities have been sometimes called workshops and supervised study. However, in essence the procedures in a humanities laboratory differ little from those in the science laboratory.

An English class might be confused about the stage setting in which Shakespearean plays were acted, or they might find difficulty in reading the dialogue. By examining different pictures, drawings, or models of the original stage at the Globe Theatre, as interpreted by leading authorities on English literature and English history, the students would be ready to draw or construct a model or sketch which would turn a historian's report into a concrete reality. After hearing professional actors speak various roles, the students could spend their lab-

⁹ E. F. Degering and H. H. Remmers, "Effectiveness of Regular Laboratory Work vs. Lecture-Demonstrations," *School and Society*, vol. 49, pp. 458-460, Apr. 8, 1939.

oratory time interpreting and reading aloud the parts. Writing paragraphs or writing original poetry may both be laboratory functions.

In a beginning language class, the teacher may help the young people to define a problem of relating pronunciation to the written word. Then he may read aloud a simple story, supplying the English words wherever necessary, while students follow in their books.

"Now," he says when he finishes, "how will you learn these words and their pronunciation?"

The students then discuss the problem and decide to use the words in the laboratory by retelling the story, each one translating the important words after offering the Spanish. One student, during this exercise, writes the emphasized words on the chalkboard.

The teacher begins, "El cuento se trata de (the story is about) . . ."

Then students pick up the cue. "Los muchachos (boys) y las muchachas (girls)."

"Un pintor (painter)."

"El pinta (paints) los muchachos y las muchachas (boys and girls)."

"No son retratos (not portraits)."

"No son anuncios (not advertisements)."

"No son pinturas (not pictures)." The student hesitates and turns to the teacher, "I want to say 'at all.'"

The teacher replies, "You would have to say, 'En verdad (in truth) no son pinturas.'"

"El pinta los muchachos y las muchachas (he paints boys and girls) sobre las puertas (on doors)."

"El pinta las palabras (paints the words) 'muchachos y muchachas' (boys and girls)."

"Sobre las puertas de escuelas anticuados (over the doors of old-fashioned schools)."

In a recent survey conducted by the United States Office of Education, in cooperation with the Modern Language Association of America, several interesting and unequivocal statements were made concerning the use of the language laboratory. In the first place, "there appears to be no question about the worth of the language laboratory in the judgment of teachers who are actually using it. All of the schools and colleges participating in the survey have reported that the educational results justify the continuance or further development of lan-

guage laboratory facilities." In the second place, the study reports on some results in achievement with the typical standardized test. One such study, conducted at eight high schools with an experimental group taught by using audio-visual materials and technics, and with a control group taught by standard text materials and technics, revealed that control groups scored somewhat higher on reading tests but that the experimental group scored higher on aural understanding, speaking, and writing. The general conclusion was "that the nature of the objective in teaching a foreign language determines the approach or emphasis and that the approach in turn affects the kind of learning achieved."¹⁰

In social studies the class might illustrate a map or construct special charts in the laboratory. Or the group might spend the laboratory time in marking a ballot for a local or national election. Teachers can often obtain enough unused town or city ballots after an election for the entire class. Holding a meeting conducted according to Robert's *Rules of Order*, or a mock town meeting, might become a social studies laboratory.

Research through reading and other means, such as field trips or other visual aids, often precedes a laboratory. The students, after defining their problem and method of procedure, must discover what the Globe Theatre looks like, how a ballot is marked, or a town meeting run. The experience, the actual doing, serves to add dimension and broaden outlook so that learning, in the form of considered hypotheses at steps 4 and 5, may take place.

Mathematics Laboratories. Drill in doing certain kinds of mathematics problems, though it may be deemed advisable, is not problem solving or use of the scientific method in the best sense of the words. Only when the student defines his own problem can he be said to engage in this method. When he is given problems to solve, though the mathematics teacher may feel that such a procedure is necessary, he does not fulfill the requirements of the scientific method.

The teacher who is tied to "this-is-the-way-I-was-taught" may have difficulty in envisioning a really workable mathematics laboratory. Mr. R determined that his laboratory would be a real example of the sci-

¹⁰ Marjorie C. Johnston and Catherine C. Seerley, *Foreign Language Laboratories in Schools and Colleges*, U.S. Department of Health, Education, and Welfare, 1958.

entific method. Immediately after entering the class, he drew a five-pointed star on the blackboard. He attempted to stimulate anxieties by talking about finding its area, determining where the points should come, finding the exact center, making the star three-dimensional. He tried to emphasize the student need for varied experiences. The students began to define problems and finally agreed on just one large one, "How many things can we find out about this star through mathematics?" They subdivided into small groups of four each, and first worked in the groups to determine what aspects of the star (such as dimension) they might discover. Then each student took one such subproblem and began working, through mathematics, to solve it. Here the students really engaged in the process of problem solving.

In other kinds of mathematics laboratories, the talented teacher raises stimulating problems for pupils. He uses the laboratory for drawing graphs and charts of the locality; for figuring out an income-tax form based on a pupil's summer or part-time earnings; for figuring markups and discounts at local stores; for measuring distances on road maps and time on several types of clocks; for measuring certain engine parts with machine calipers; for measuring with other devices that might be used by the builder, the airplane or ship navigator, or the civil engineer. Laboratory periods in mathematics might be devoted to making geometric constructions on paper or out of cardboard, or to making models of geometric shapes out of cardboard, wood, or metal. The student then is able to discover mathematical concepts by using his understanding to construct a figure or model.

Practical Arts Laboratories. Homemaking, business practices, and shop mechanics are the most common practical arts. What are the problems involved in cooking, sewing, and child care? How does a secretary fulfill her responsibilities? How does a business keep account of its money? What does an electrician have to know in order to be a licensed technician? What is apt to be wrong with a car when it fails to start on a cold morning? These and similar problems may be defined and solved by pupils with the teacher's help. In modern secondary schools, which generally provide laboratories for solving practical arts problems, pupils are faced with problems, or the teacher helps to stir up anxieties. Then students solve their problems in the school cooking room ("What are the advantages and disadvantages of the packaged cake?"), the automobile shop ("How can I stop this car from using so

much oil?"), or in the school bank ("How should our books and records be maintained so that the local bank will approve our accounting?"). The opportunities for laboratory work in this area are unlimited.

The Stages After the Laboratory

As we have indicated, the smooth move from the laboratory to appraisal must be the result of predetermined decisions (at step 2) on how hypotheses will be reported.

At step 5 a pupil's ability to see the shortcomings of his findings or the new possibilities for critical thinking should result from a good laboratory. The teacher can help him to this vision. In an English laboratory students may have found that a good paragraph contains a topic sentence and often a summary sentence. At step 5 the teacher helps the students to realize that sometimes a good paragraph may read simply, "Jesus wept." In a cooking laboratory the hypothesis of most of the students may be that a given pudding will bake perfectly in thirty-five minutes at 350 degrees. Here the teacher needs to help the group to realize that if they move to a high mountain these conclusions will prove false. If students in a chemistry laboratory produce a certain compound by mixing specified amounts of two elements, they may need to consider what would happen if these same elements were blended in a really high-pressure chamber. Here the emphasis should turn also to the question, "What else do we need to find out now?"

Special Laboratory Forms

Several different kinds of laboratories extend our knowledge of the possible uses of the technic. We describe here various forms which the laboratory may assume.

Student Demonstrations. After students have discovered information and opinions during research, they must inform others of their discoveries and conclusions. Often at this stage a student demonstration indicates to other students ideas, concepts, or information, which they neglected in their own laboratory work. Students solving problems in a mathematics class may exhibit to their classmates, by a blackboard demonstration, their procedure for arriving at a solution. Students in

an English class may demonstrate a setting which they believe gives the appropriate environment for study of a given play. Illustrations and collections may be demonstrated to the class. When a student's hobby, such as ham radio, will add information about the problem being studied in the laboratory, he may be asked to demonstrate it.

The teacher works with the student to see whether he is ready to perform a class demonstration, especially when its complexity equals that of exhibits at science fairs. Then the teacher must assist the class in relating the results of the demonstration to the problem under investigation, asking for hypotheses and for the relation between the demonstration and the over-all problem. Umstattd says that here ample time should be afforded for discussion of procedure and results.¹¹

Projects. The term project denotes the making or putting together of a material object. Projects may hold real significance in learning, but there is a danger that they may become "busy work." In one seventh-grade geography class the group studied the major cities of the East coast. The teacher asked each pupil to construct at home a picture notebook of a different city, and the better ones were exhibited about the room. No other recognition was given. In a similar class, when the group was told that their next unit would be a study of the major cities on the East coast, the teacher asked what cities individuals had visited. The class proved to have been active visitors; the cities ranged from Bangor, Maine, to Miami, Florida. The students discussed their visits and decided that their problem would be to visualize the cities. This they could do if they took an imaginary trip along the coast in a bus. It was decided that one or more pupils each day should act as guide to a given city and should make a brochure of illustrated materials and facts about the city. The individual projects gave the class an understanding of the Atlantic seaboard, and all of them were able to find similarities and dissimilarities among cities. Each individual project was displayed in the room.

Projects fall into two general categories. One is the short project, which may take only a period or two of class time, with everything needed to complete the project available in the classroom. This type of project may be undertaken by an individual, a small group, or the whole class. The other type involves research or physical work, partly at home or in the community, and is usually an individual effort. The

¹¹ Umstattd, *op. cit.*, p. 314.

geography class project, in which some work was accomplished at home, illustrates the latter type. The former might be a concerted attempt by a total junior high school mathematics class to draw a pie chart and make other accountings of class expenditures; or it might be work by small groups in a senior English class to put out a class paper. A project may involve reading or writing, then, but it also must include manipulation of some other kinds of material.

The talented teacher forms many ideas about projects which relate to the problems that students want to solve in class. Furthermore, teacher and pupils evaluate all projects before undertaking them to determine their pertinence to the problem raised, and the availability of equipment, facilities, and time necessary for the successful completion of the project (step 2). The teacher and students assess, also, the readiness of the pupils, in terms of subject background and personal maturity, for the suggested project.

Students in second-year Italian wondered if they could order dinner in Italian. The problem was stated, "Do we know enough Italian to order something to eat if we go to Italy?" The teacher and pupils discussed ways to solve their problem, and someone suggested an Italian dinner for the class. The students planned necessary tasks and assigned each one to an individual; some would bring food, some plan menus, some arrange tables. It was decided that at the dinner itself no class member might eat anything unless he asked for it in Italian and paid in Italian play money. The class also planned for an Italian social hour after the meal. Recordings of most of the speaking were made for future class use. After the party, the next class meeting was devoted to consideration of hypotheses reached in solving the original problem (step 4) and the place of the conclusions in future learning (step 5). They decided they could order *pasta* in Italy, and even help in social work, someday, among hungry Italian children.

The project involved the entire class in planning and execution of the laboratory and in evaluation of the result. It led pupils to further problems by demonstrating their weaknesses. Thus the teacher who has good rapport with his class may help pupils to deeper understanding through projects.

Role Playing. Role playing aids students to feel with people from history, fiction, or contemporary life, and thus to understand better why a person acts in a given way and what his feelings are at the time

of action. The most popular forms of role playing involve dramatization of a play or story, a mock trial or election campaign, or the acting out of a current problem as the pupils themselves see and feel it. Mental hospitals employ this technic to obtain a release of patients' feelings and to develop understanding of other people.

John may wonder how Abraham Lincoln felt and then stand before his class to deliver the Gettysburg Address as a way of solving this problem. The class members not only read and interpret historians' points of view, but they become almost a part of the act of history itself. Feelings strengthen understanding. The teacher may take his class back in time to understand what it was like in the Golden Age of Pericles or in the Dark Ages. One teacher said to her class, "What would our town be like if we were under the Communist form of government?" The class considered the school, the stores in town, the churches, and the types of homes and cars people owned. They decided to solve this problem by assuming roles of community members under a Communist government. They experienced a real feeling of the meaning of such a form of government as they compared their life in a democracy with life in the Communist society of Soviet Russia. English teachers, in a similar manner, use role playing to assist pupils to feel the problems faced by characters in books.

Role playing is an excellent device to help students act out, with dialogue which they manufacture as they go along, the lives and opinions of people currently in the news, or (in an adjustment class) the attitudes of those closest to them, for instance, their parents and teachers.

Other Views

Again we offer the words of other writers as a means of arousing new anxieties and adding to or strengthening hypotheses and judgments already drawn about the laboratory technic.

Why a Laboratory? The laboratory furnishes a psychologically sound "hunting ground." Children who are curious learn by doing. Since they differ in ability, laboratory work can offer them individual experiences. The laboratory is a release from the usual teaching technics. Laboratories are excellent in the move from the concrete to abstract; they teach problem solving.

A citizen in a democracy needs the ordered scientific method of thinking. With this technic teachers touch not the content but the method of science; thus pupils learn a skill which they may take away with them.¹²

Developing the Laboratory. Development will come through patience; it takes time to develop a reasonably complete laboratory. Planning has its part. Have a good plan and then work toward it. Have enthusiasm. The teacher must be sold on the teaching of science. Use industry. The teacher who gives of himself often gains community support. Offer reasons. The supporters need to know why the laboratory is needed. Get usable equipment. The plan should be to acquire the most useful equipment first. Offer community service. Try to find the requested information. Charge no fees. The school should assume the responsibility.¹³

The Chemistry Laboratory. Criticisms of most ways of conducting chemistry laboratories are that though chemistry has changed, experimental programs in schools have not, that students learn little about the scientific method, and that students emphasize results instead of understanding the process. Various suggested solutions are: to dispense with most experiments in manuals, and instead to use problems found by students; to get the students acquainted with equipment so that they can use initiative in setting up experiments; to let the students know what the problem is before the laboratory; and to allow them to discover their own errors instead of rating them on laboratory results. Thus there will be less imitation and more student interest.¹⁴

Laboratory Procedures. The first step is for the class and teacher to make a list of topics covering all aspects of the subject the class wants to consider. The next step is to make a list of possible ways to investigate the problems named. Then the students may decide which topics each will present to the class, individually or in groups. When a report is presented, students who know the material may spend time

¹² Lloyd V. Manwiller, "Laboratory Activities—Why?" *School Science and Mathematics*, vol. 56, pp. 85–89, February, 1956.

¹³ C. Chapple, "Developing the Physics and Chemistry Laboratory in the Small High School," *School Science and Mathematics*, vol. 56, pp. 697–699, December, 1956.

¹⁴ George G. Mallinson and Jacqueline V. Buck, "The Inductive Method in the Chemistry Laboratory," *Journal of Chemical Education*, vol. 31, pp. 634–636, December, 1954.

in the laboratory. Facts concerning the proper use of instruments in the laboratory should be mimeographed and given out. Students should handle the equipment themselves.

Each student should keep a notebook recording notes taken from discussions and from reading, and a description of the laboratory investigation—data observed and their implications. This may be done in groups of two or four.¹⁵

Citizenship through Laboratory. Students in one class adopted the community's project on Civil Defense. They studied what the community was doing and brought the results of their investigation before the whole school, using an auditorium presentation so as to broaden the entire experience. The results carried over to later interest on the part of many students in Civil Defense.¹⁶

English Laboratory. Every member of the group must read, speak, listen, write. Here the student becomes his own best critic. Language is first discussed in the large group, after which the teacher guides the student through exercises to improve his abilities. The tape recorder and other equipment are used. Sometimes the class works as a whole, sometimes in small groups. They choose their own assignments.¹⁷

* * *

The laboratory technic is a vital part of teaching through critical thinking. With reading, it comprises the most commonly used technic for research. Its philosophy is, "Do or explore it yourself." No student who merely observes or reads other people's ideas, who holds little knowledge of the scientific method from his personal experience, really follows through the various steps of problem solving. This criticism applies to work on many kinds of problems, from how much a cubic foot of lead weighs to how to go through customs in France. A student must experience something, feel it, do it himself, before he forms hypotheses and judgments, and thus before he himself does critical thinking. Otherwise his findings will be parroted, will perhaps echo as did Aristotle's declaration about the falling of two unequally

¹⁵ Paul Westmeyer, "A Laboratory Method of Teaching Physics," *School Science and Mathematics*, vol. 56, pp. 662-664, November, 1956.

¹⁶ Dorothy J. Pauls, "I Figured without Jerry," *Social Education*, vol. 17, pp. 153-155, April, 1953.

¹⁷ Ruth I. Golden, "The English Language Laboratory," *The English Journal*, vol. 46, pp. 28-31, January, 1957.

weighted bodies. It took nearly fifteen hundred years and the alert mind of Galileo to "do" this experiment and to prove that the parrot answer so long believed was false—that in reality all falling bodies descend with equal velocity.

Laboratory and reading comprise together the most common means for reaching steps 4 and 5 and judgment. For many kinds of problems student experience in the laboratory is the only path which leads to judgment. Thus the teacher who does the experiments for the students closes to them one of the straightest avenues to critical thinking. They cannot in any other way learn to form judgments and understand the relationship of judgments to other learning. Arguments about time and money are blinders; it is better to spend the money and use the time for one problem properly solved than to dole out to students one hundred answers which they do not believe because they have not worked out hypotheses themselves.

Like discussion, the laboratory technic is vital. We cannot envision the talented teacher attempting to teach without it. If the reader's need and resultant learning has been different, we assume that he has pursued the steps of critical thinking and that later he may, in the classroom, subject his hypotheses to the scientific method.

LEARNING MATERIALS

*Suggestions for Further Reading**

1. Hoff, Arthur G.: *Secondary School Science Teaching*, McGraw-Hill Book Company, Inc., Blakiston Division, New York, 1950.
2. Whitney, Frederick S.: *The Elements of Research*, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1950.

* See also the summaries under *Other Views* in this chapter. See also the list following Chapter 11.



9

The Communications Technic

Although forms of the word "communicate" were used in the past (Robert South said in 1676, "Speech was given to the ordinary sort of men whereby to communicate their mind; but to wise men, whereby to conceal it"), the concept of teaching communications is comparatively recent. Great-grandfather learned reading, writing, and speaking (or, as he might have phrased it, "reading, writing, and orating"), but he would have been astonished to discover that he studied communications. The communications technic, as we conceive the term, applies to the help a teacher gives to students directly in reading, writing, and speaking; it does not apply to supervision of general discussion. Listening and discussing, often listed as part of communication, we have considered earlier, in the chapter on coalescence, because they are an integral part of all technics. They differ from the communications technic in that their area is intergroup, that is, students listen and dis-

cuss as they deal exclusively with one another and with the teacher as group leader. Reading, on the other hand, implies an individual attempt to garner ideas intended for communication by some one outside of one's group. Writing and public speaking are ways of communicating information and opinions to whoever may read or hear one's thoughts.

The Need for Teaching Communications

Life is a process of communicating. The question of how much time a person spends on each phase of communication has been studied by Rankin. He asked forty-seven people to tabulate their language activities for a forty-nine-day period and found that they spent 47 per cent of their time listening, 28.5 per cent, speaking, 17.3 per cent, reading, and 7.2 per cent, writing. Then he studied the amount of time the schools spent on each activity and found that 52 per cent of the time was spent reading, 30 per cent, writing, 10 per cent, speaking, and 8 per cent, listening. His conclusion was that emphasis given in the schools is inversely related to the use of the communications skills in life.¹ Findings from similar studies may aid teachers to attempt to emphasize the most needed areas of communication.

The alert teacher, therefore, teaches reading, writing, and public speaking; he no more neglects them than he neglects stimulating anxiety. For he realizes that the ability to gather and to impart information and attitudes is vital for every student at various stages of critical thinking. In defining the problem and in research, at one time or another, most students will need to read, and to read accurately and creatively. In forming hypotheses, most students will need to write a summary or report on paper, again accurately and creatively. At steps 1, 2, 4, and possibly 5, most students will sometime be asked to speak publicly; their listeners will appreciate accuracy tinged with imagination. The thoughtful teacher never declares in the teachers' room, "I don't see why the English department doesn't teach anything in this school. My students can't read, write, or speak in public." Such a statement implies only ignorance and lack of understanding.

¹ Paul T. Rankin, "Listening Ability," *Chicago Schools Journal*, vol. 12, pp. 177-179, January, 1930.

"Reading," states the Commission on the English Curriculum, "is a complex network of abilities which continues to develop through all the years of school."² Extensive research in the subject of reading points to the fact that it is a developmental process, requiring special attention throughout the school years. Although there is not as much experimental evidence for writing and speaking, they, too, clearly demand careful consideration at all levels of development. Therefore the talented teacher of mathematics, business, history, or core areas teaches partly through the communications technic.

Limiting our discussion, then, to the formalized type of communication, which we call the communications technic, we turn to consider its basic meaning and implications. The problems in teaching reading, writing, and public speaking are infinite. Basil reads at the fifth-grade level, slowly and painfully. Bryan, on the other hand, reads as quickly and with as good comprehension as a college senior. Dick, who excels in mathematics, finds creative writing distasteful; in an hour's time, he manages to produce only one paragraph which is stilted and poorly expressed. Janice writes poetry in her spare time; in a given hour, she creates a well-written paper, polished and alive. Caryl is shy and feels little sense of belonging. Delivering a report in public or participating in a panel panics her, and most of what she says is disorganized and preceded by many *oh's* and *ah's*. George rises quickly to offer, without notes, a well-coordinated report with as much ease as an accomplished orator. Thus the communications technic involves careful appraisal of each student's ability and attention to his special need. We note also that those who excel and those who function passably require as much attention as those who lag behind; they need direction and further development.

The Technic as the Teacher Considers It

The teacher cannot be expected to perform miracles with the communications technic, but he must understand the process thoroughly. He must be able to help students to understand it, too, and in communications, as in discussion, he must emphasize cooperation. Ob-

² The Commission on the English Curriculum of the National Council of Teachers of English, *The English Language Arts in the Secondary School*, Appleton-Century-Crofts, Inc., New York, 1956, p. 163.

vously we communicate by means of words. As John Locke observed, words are so doubtful and obscure, their meaning, for the most part, so uncertain, that if our thoughts busy themselves with words, and stay with the names of things, it is not strange that they are misled. Students know little of the importance of semantics and of the confusion inherent in interpreting the words of another person. The teacher, then, through the communications technic, assists young people to realize the process by which words are uttered, written, or read.

Showing the Process of Communicating. "When we communicate," Schramm points out, "we are trying to establish a 'commonness' with someone," that is, "getting the receiver and the sender 'tuned' together for a particular message."³ A sender, Schramm continues, wants to communicate information or feeling. He encodes it into spoken or written words. Once coded and sent, the message is free of the sender, who then wonders whether "the 'picture in the head' of the receiver will bear any resemblance to that in the head of the sender."⁴ Basil, who tries to read quickly and accurately, Dick, who produces but one paragraph in an hour, Caryl, who stumbles as she speaks, all these youngsters and their peers must come to understand that they are trying to reach other people through a process which can be learned. If the adolescent is to be led to fulfill the teacher aim for thinking, then reading, writing, and public speaking must be improved. Understanding the process will enhance ability.

A class in mental health, with help from the teacher, chose its own courses of study. They had defined the problem, "How much kissing and loving should be expected on dates?" The students were seniors in high school. After determining that they must read to discover the attitudes of experts in mental health, the students requested suggestions about sources of information and opinion which might help them. The teacher pointed out in his own class library the shelves which contained helpful material; he also gave permission to a small group to visit the school library to find other books and articles on the subject. But the teacher's role does not end when the students have in their hands material to read. He not only must help students to use indexes and tables of contents, to develop accurate ways to take notes,

³ Wilbur Schramm, "How Communication Works," *The Process and Effects of Mass Communication*, University of Illinois Press, Urbana, Ill., 1955, p. 3.

⁴ *Ibid.*, p. 4.

and to tabulate the necessary information about the book or periodical, but he must offer ideas about how books communicate—how a reader can do his part in establishing connection with a writer.

The teacher might say, "The author that you will be reading is trying to tell you something. You may come back and say to the class, for example, that the author talks about how many teen-agers were found to believe in petting. But through his words the author is trying to let you know what he believes, too; perhaps he is trying to persuade you of the truth of an idea. When you read, remember that words are being used to give information, but that they also convey attitudes." At first, the teacher might take time to discuss this matter with the class so that they could grasp the distinction between information and attitudes and thus come to define their own problem in relation to communication, progressing from there to thinking. Later, after the class has had considerable experience, a mere reminder should suffice.

The same kind of help and reminder, used at the stage of preparation for writing and public speaking, should help students to awake to their own intentions, i.e., to gain attention to what they say, to employ symbols which are not easily confused, and, if they so desire, to present an idea cogently to someone else. In order to perfect their technic, students should envisage a broad and inclusive audience, composed not only of their peers, but of teacher, supervisor, and principal, and other class visitors, perhaps parents and friends.

The teacher thus aids students to realize that communicating implies more than the passing on of information. In their writing and public speaking, students must be asked, over and over, to emphasize themselves, their personal ideas, their beliefs, their hopes. When Laurie prepares her speech at the end of the study of the question on kissing, she might very well be tempted to rise and say, "I read *Letters to Jane* by Schultz. She believes that maybe a little kissing is all right, but nothing more, because it can lead to too much danger." Such a report fails to meet the demands for step 4 of problem solving—the pulling together of discoveries and the forming of hypotheses. Laurie has performed only half the job. The teacher might say to her or to the class, "It is important to report the information given by the writer you have read, and of course to do that accurately, you must understand his beliefs and ideas. But then there is the next step. In giving a report you need to give something of yourself. You need to state

what you believe and why you believe it. Only then are you forming hypotheses and putting your ideas into workable form." Or he might emphasize the observation of Lloyd George that speech was made to open man to man, not to hide him. Here the emphasis lies upon the expression of the real individual.

Showing the Need to Verbalize. As the teacher examines the communications technic, then, he sees that his first duty is to help young people to understand words as a means of transmitting an "encoded" message which contains both information and attitude. The second role of the teacher is closely related to the first. He helps students to understand that un verbalized concepts fail to constitute thinking; the learner who cannot put his thoughts into words has not learned. A student who, in forming hypotheses, says, "I know what I got out of my reading, but I can't stand up and tell the class about it," or, "I can't write it down for anyone," needs to realize the close relationship between knowledge and verbalization.

When a problem is defined and the way to its solution agreed upon, the teacher might say, "We agree that we want to know how much kissing and loving should be expected on dates. Now you have decided to read individually and then to summarize your findings orally. Let's remember that you must be able to state your hypotheses clearly before the group. Any ideas which you gather up but can't yet use will be of little help now in solving your problem. It is important to be able to express your ideas clearly and accurately if they are to have meaning for you as well as for your audience."

Discussion at the early stages of this experience helps students to define individual problems in relation to communication and to work to solve them. As the teacher uses the many aids to clear thinking at his command, he finds that from a student's clear thinking comes better understanding and improved ability to convey ideas; from conveying them comes renewed understanding and clearer thinking. A beneficent circle!

Preparations for Communicating. The teacher discovers still a third area which he must undertake to explore in this technic, that of preparation. If students are to read, we assume that they know why they are reading and what they are looking for because they have tried to define a problem and find the way to solve it. But also, they must be helped to discover suitable material. They must learn how to seek the

answers to their problem on a written page and how to record their findings. If they are to write or speak, they must be led to discover or design an organizational pattern, to preplan what they want to say and how. These matters will be considered with the group as a whole and again with individuals. On the other end of the continuum, the teacher must spend time making corrections. Larry read one chapter from the book *Marriage for Moderns* by Bowman. When he finished, he had collected a good deal of material, none of which related to the problem as it had been defined. The teacher talked with him, helping him to understand wherein he had failed and how he might improve next time. Francie uses poor grammar. In her oral report, she repeatedly said *don't* for *doesn't*. The teacher, who had been making notes on each student's performance, handed her a 3 by 5 card at the end of her speech, on which she found his suggestions for improvement in usage. On a student's written report, the teacher would have indicated inconsistencies, poor structure, and misspelling. A teacher cannot hope to develop thinking in his students if he neglects preplanning and later correction of both technic and usage. Francie and Larry will not improve in their performance, nor can they be expected to, unless the teacher offers suggestions for that improvement. Later, such suggestions and helpful criticisms may become a class project where students help one another and where each student has a part in criticizing himself.

Speaking

Students speak in public in all the steps of problem solving except research, most commonly at steps 2 and 4. The teacher, having armed them with a general knowledge of communications and helped them with preplanning, must emphasize certain aspects of speaking which differ from other kinds of communicating. Comenius said that in school students should learn to write by writing, to talk by talking. It is important to see that the claims of teaching speech are not ignored in the traditional emphasis upon reading and writing. Public speaking need not be a time-consuming and usually dreadfully boring recitation by one student after another. It should be informal and brief, so that everyone may have practice at repeated intervals. The Commission on the English Curriculum says, "The schools must prepare boys and girls

to speak with a sense of responsibility and to understand the ways in which language is used to sway opinion and to determine action.”⁵

In forming hypotheses, in appraisal, and in forming judgments, students may need to be made aware of the possibilities for individual reports which will be helpful to the total group. Youngsters who fear to stand up and speak often find ways to avoid this responsibility. In a social studies class, where one student after another offers a morsel from the newspaper, the students discover little value in either speaking or listening. But the experience can be made interesting. One such class, studying current events, began to consider an issue which was headlined in the newspapers at the time. Five students studied five different papers or news magazines; then each one spoke for a few minutes presenting a definite point of view adopted from his reading. In this way individual reports became meaningful and worth while to both speaker and listeners.

At steps 2, 4, and 5, opportunity may often be given to selected representatives (or to all the members of a small group) to report aloud the ideas of their group. The teacher, though not an expert in public speaking, may offer suggestions for improvement. He should be attentive to English usage, to organization, to the relevance of the report to the problem, to the speaker's attitude toward listeners, to voice and emphasis, to diction, to poise, and to general impression. When the class becomes really cooperative, students should criticize one another, their purpose being not to pass judgment, but to help the speaker to better performance in his next speech. A record of the speech on a tape recorder should aid the student to evaluate himself.

A class in English was to undertake a unit on biography. The teacher spent the first class period in arousing anxiety about the value of studying biographies. Half of the class felt that they would like to work together, choosing one individual and studying him from different approaches. The rest of the class wished to study, each one by himself, the life of his own chosen individual. The students were not made consciously aware that they were engaging in the first steps of problem solving. Both groups together considered possible ways to study lives of famous persons, reasons for so doing, and plans for telling one another about their discoveries.

The second group then turned individually to their various studies,

⁵ *The English Language Arts in the Secondary School*, p. 203.

having chosen famous persons ranging from Plato to Babe Ruth. At step 4 they told one another, in informal reports, what they had found interesting and worth emulating in the lives of these individuals. The first group agreed to study the life of Robert Browning. Some of the group would read about his life, as told in various biographies, and others would read his poetry; then they would tell one another, in informal reports, what they had found out about Browning, what they enjoyed and admired in his life and his poetry. With this material gathered together, they could all draw a composite picture of a great man and ask themselves if their own lives could acquire a measure of greatness. Here speaking publicly is not undertaken for its own sake, but for an integral purpose in the steps of thinking.

Writing

Marvin Barloon, in an article explaining his technic for teaching writing in an economics class, says, "English is the stuff of which the subject is made. Thought and language are one. In acquiring the skill of writing what he means, the student learns what he means. Furthermore, on the occasions when he really cannot put what he means into coherent verbal form, he learns that he does not mean anything and had better leave the page unspoiled."⁶ A good teacher assumes a responsibility to teach the kind of writing which is necessary in his classroom. The mathematics teacher does not teach poetry, but he advises students how to write clear, accurate, organized reports of findings and results of work, and he makes available to them samples of well-written reports. Neither does the history teacher teach poetry; but the reports of his students exhibit organization, clarity, and creativity; a mere listing of the events of the battle at Agincourt will not suffice. For instance, a student might read and report on Shakespeare's account of the event; or in another class, a student might compare the Bible's description of Sennacherib's invasion of the kingdom of Judah with Byron's description, "The Assyrian came down like the wolf on the fold." In teaching writing in his course, or core, then, the teacher asks students to examine examples of the kinds of writing which are especially effective in that particular area of study.

⁶ Marvin J. Barloon, "How to Teach Students to Write Clearly in Courses Other than English," *AAUP Bulletin*, vol. 39, pp. 286-292, Summer, 1953.

At the preplanning stage, the organization of a paper, in the form of a simple outline, is decided upon before writing begins. During the actual writing, if the student realizes that the teacher notes inaccuracies in spelling and usage, he will review his own work as precisely as possible. If the teacher stresses the importance of including attitudes in writing, as we suggested previously, the student will begin to know what he means by his statements. He will gain understanding of himself and his beliefs; and often the teacher will hear him say, "It made me understand so much better when I had to put it down on paper."

Several studies show that the more writing a student undertakes the more transfer will take place. Kaulfers concluded, after conducting several studies in teaching grammar, that transfer will occur if grammar is made functional, that is, if the teacher provides numerous opportunities for writing and speaking and then corrects the student's usage in his written reports or speeches. This will provide meaning for the grammatical concepts which are taught.⁷

Lokke and Wykoff experimented with two groups, one of which wrote two themes each week and therefore received less formal instruction in the mechanics of writing than a control group that wrote one theme each week. They reported that having students do more writing produced better results than using time for formal instruction.⁸ Practice in writing, as would be expected, enhances ability to write.

Students write predominantly at steps 4 and 5 of problem solving. In a general civics course, the class undertook a large unit entitled "Modern Problems," one subdivision of which was "Propaganda." In stirring up anxiety in a program of this sort the teacher might offer ideas about propaganda; he might ask leading questions, such as, "Would you vote for a member of a political party which published personal, derogatory information about candidates from other parties?" Then he might ask that the group write down what they think at the time about propaganda. "This will be informal," he would say. "Just write what your ideas are about propaganda." Later, after pursuing

⁷ Walter V. Kaulfers, *Four Studies in Teaching Grammar from the Sociopsychological Viewpoint*, Stanford University Press, Stanford, Calif., 1945.

⁸ Virgil L. Lokke and George S. Wykoff, "Double Writing in Freshman Composition: An Experiment," *School and Society*, vol. 68, pp. 437-439, December, 1948.

with the class the other steps of critical thinking, he would review these ideas as one check upon the amount and kind of learning the students had acquired. In defining problems, too, the students might agree to write out their preliminary ideas on the problems which the class should pursue, so that they might be compared with the final decision.

In forming hypotheses, more formal reports are written. Sometimes the students write down their findings from laboratory work. In the study of propaganda, five students agreed to read five different examples of propaganda and to offer a written report on the various attempts to sway readers. The problem had been previously defined as, "How does propaganda sway people, and how can we watch out for it?" Robie read magazine advertisements, and made a list of appeal lines in these displays, adding a note on the nature of the appeal. "Kentuckians themselves overwhelmingly choose Early Times over all other straight whiskies,"—prestige. "Schlitz makes any game more fun,"—enjoyment and pleasure. "New invention gets children to drink more milk,"—health. "Summertime elegance by Schenley,"—prestige. Robie had collected many such items, and now it became the teacher's task to help him to write a meaningful, creative report.

The teacher tried to help Robie first to review the basic matters previously discussed, especially the need to emphasize oneself and one's own beliefs. "Robie, what does all this mean to you? You need to tell in your report what you discovered, that is, you must report accurately what you found out. Then you need to put yourself into your report and show how all of these findings affect you—your thinking or your conduct." Here the teacher, following Barloon's suggestion, led Robie to discover what he thought. The teacher helped also in organization, discussing with Robie his preliminary ideas about material he might include and its arrangement.

At step 5 and in formulating judgments, the process of writing a report follows the same pattern. A student summarizes his findings, notes their relation to his present learning and to what he wants to know, and at the same time presents any judgments he has been able to make.

In any of the subdivisions of the communications technic the teacher must be aware of the ability of the individuals in his class. Some students enjoy writing and write easily and well. Such students should

be helped to work out more creative writing than those who find writing a difficult chore.

Reading

The need for good reading ability is not to be underestimated. The student who reads painfully, with little comprehension, is penalized in every area in school, and often in later life. "Studies of the school progress of youth show conclusively that development in ability to read is continuous throughout elementary, high school, and college years."⁹ The teacher must, therefore, understand his students' abilities to read and must offer each one appropriate material.

Standardized reading and intelligence tests should be administered by the guidance department and then interpreted for each teacher. If the guidance department fails to offer such a report, the teacher must ferret out the information. Practically all schools list reading and intelligence test scores. In reading, as in other areas of communications, the teacher will find vast differences in ability, and he must offer his help accordingly.

"Developmental reading," or reading improvement, "is designed for students who fail to read as well as tests of general ability indicate they are able." This statement defines a retarded reader as one whose ability is greater than his reading level. "Improvement in reading skills," these authors continue, "is often concurrent with improvement in personal adjustment."¹⁰ Thus remedial reading, for students whose ability level on intelligence tests indicates that they should read better than they do, is a job, not for the classroom teacher, but for guidance and remedial experts. However, in the classroom the teacher must help all students: those whose general ability, and thus reading ability, is below the level of the class; those who should be or who are receiving remedial and guidance help; those who read mechanically, though in an acceptable fashion; and those who read as well as the teacher himself. The responsibility of the teacher is to understand the

⁹ *Reading in the High School and College*, in Nelson B. Henry (ed.), *The Forty-seventh Yearbook of the National Society for the Study of Education*, University of Chicago Press, Chicago, 1948, part II, p. 3.

¹⁰ Maurice D. Woolf and Jeanne A. Woolf, *Remedial Reading: Teaching and Treatment*, McGraw-Hill Book Company, Inc., New York, 1957, p. 34.

level of each one of these students through interpretation of the test results, information from the guidance department, and his own observations, and to help each one to choose reading commensurate with his ability.

The teacher's second responsibility is to help each student to read more effectively the material to be used in a given classroom. Understanding, then, that reading abilities differ, the teacher familiarizes himself with many possible sources of information and opinions which students may read, and catalogues them according to difficulty. An advanced reader in twelfth-grade social studies may read Toynbee, but such an undertaking for a student reading at seventh-grade level would be absurd. A better than average student may read articles in the *Encyclopedia Britannica*, but the slow reader should be offered a weekly news magazine or perhaps a textbook at an eighth-grade reading level. Good classroom libraries are therefore requisite, in addition to planned visits to the school and town libraries for help from the librarian in choosing material. It is the responsibility of the teacher to investigate reference books and other authorities, so as to have appropriate reading available. Students should be encouraged, too, to take to class articles and books which pertain to the problems needing solutions. As he attempts to raise the level of reading of all students, the teacher assumes his rightful position as a teacher of his course material and of all its implications in the life of his pupils.

Much of the reading of a class group will occur during research. Here, since students have defined a problem and the way of attacking it, they know clearly what they want to learn as they read. Good reading occurs when the student knows why he is reading. With the problem-solving approach, this definition of the problem and thus of the purpose of reading has occurred already, so that the student turns to reading with a sure understanding of what he wants to find out.

In teaching reading, the teacher is responsible for certain other clarifications. At the preplanning stage, he must explain any special vocabulary. "In-group," "alliteration," "equate," "chemical calculations"—these terms hold no meaning for most adolescents. Because the words are so familiar to the teacher, he sometimes forgets that they are completely new to a student. The youngster becomes completely befogged in an attempt to read about the "in-groups" of the American culture; the term has as much meaning to him as "zbtqp."

Another vital consideration in preplanning is the matter of taking notes on reading. The teacher may explain many times and in many ways that one takes down those ideas which apply directly to the problem the group or individual wishes to solve. Helping students with such mechanical matters as recording each idea on a separate 3 by 5 card, and having a means for identifying the book and the page number, will assist them to read carefully. Then the teacher may add, "You need to look for the philosophy, the beliefs of the author as you read. Is he trying to make you believe something?" In some classes, the teacher may ask also, "How well does he say what he says?" The "Q3R formula" may be used by the teacher to cover these matters. Strang lists them as: Q—raise questions to be answered (already done in the process of problem solving); R1—read for answers, R2—review to be sure of them, R3—recite in the form in which you will use the ideas.¹¹

Where the student is attempting to consider style of writing, slow reading is essential. The teacher should explain this matter and provide ample time. When a boy or girl is reading only for content, part of the reading may entail skimming. The teacher must explain what permissible skimming means—how to read topic headings, how to use the index to find topics related to the problem under consideration, and how to skip irrelevant material. Thus the teacher needs to help students to decide how they will read and then to point out and discuss with them necessary technics. The student's approach to the French grammar's first chapter, "The Noun: gender, indefinite article, definite article," must be different from his attack upon Chapter 1 of his algebra textbook, "Dependence; formulas. Variables and constants." And these two approaches can bear no relation to his vision of a "new planet" when he reads for the first time, "O wild West Wind, thou breath of Autumn's being." The student will hold very few concepts of the differences in approach here unless the teacher helps him to find out. The teacher observes also. He watches the actions of Henry and Dottie as they read, and sees that one is following with his fingers or his lips, the other turning pages over helplessly, reading nothing. The teacher must show them how to read more easily and intelligently. For students who read slowly but have ability to read more quickly, the teacher may suggest, "Take a 3 by 5 card and set it just above the first

¹¹ Ruth Strang, "Guided Study and Homework," *What Research Says to the Teacher*, Department of Classroom Teachers, NEA, 1955, p. 6.

line of reading. Move it over this line just so that it is uncomfortable to keep up with the card. Keep moving it down the page just a little faster than is comfortable."

For improvement in comprehension, the teacher may work with individuals as they attempt to take notes or to put down the opinions and attitudes of a writer. Helping them to rephrase the material they have just read, to point out indications of attitudes and opinions, will improve their comprehension. With the total class the teacher must emphasize again the need to discover both information and attitudes and then to react with one's personal interpretation. A quotation from Adler might help here. He suggests that when people are reading a love letter they really read. "They read every word three ways, they read between the lines and in the margins, they read the whole in terms of the parts and each part in terms of the whole; they grow sensitive to context and ambiguity, to insinuation and implication; they perceive the color of words, the odor of phrases and the weight of sentences."¹²

Reading, then, is vital. It must be a cooperative effort involving teachers and students—all of them, without exception. Bacon said, "Reading maketh a full man." If Susie graduates still finding the effort to read so painful that she shuns the directions on a bottle of shampoo, the teacher has fallen short of producing an intelligent human being, let alone that full man who is a thinking man.

Other Views

Again we include the words of other writers and perhaps of other philosophers. These are presented as an incentive to further interest and learning.

An Approach to Reading. Reading is often difficult because it deals with a world unknown to students. In historical reading, it is often wise to start with the present and move backward. Students move smoothly back to the beginning of the cowboy era or to the California gold rush. Then easy associations pave the way for times less familiar.¹³

Glossing. Some young people who have a slight reading problem have difficulty in understanding vocabulary. The term "glossing" means

¹² Mortimer J. Adler, *How to Read a Book*, Simon and Schuster, Inc., New York, 1940, p. 14.

¹³ Harold Morrill, "Reading Through Time," *The School Review*, vol. 64, pp. 363-365, November, 1956.

that when reading to students from their books, one sometimes stops to explain terms and concepts. Often a page of reading thus glossed comes alive, and concepts gain real meaning for students who might otherwise miss much of what lies on the printed page. The teacher intersperses his comments with background information, and with comments on the relation of the ideas to other areas of learning and to present-day controversies. Glossing will help students to realize how much material can be gained from the written page, to improve vocabulary, and to understand what it means to summarize reading.¹⁴

Creative Writing. A basic step in teaching students to write creatively is to point out that artists rely upon their own experiences. Awareness must be sharpened so that skills finally appear as desirable tools for self-expression. Important considerations should be motivation of the student by the teacher, the preparation of a rough draft of the story or other projected writing in class, the writer's evaluation and revision of his finished work, class evaluation, and teacher evaluation. Evaluation should be both careful and extensive and may be done anonymously by having each student choose a pseudonym. Creative writing helps one to understand others better and to express oneself better, to appreciate more fully cultural activities and to participate in them, and to gain better adjustment.¹⁵

Judging Writing. Writing should be measured by standards decided upon by students and teacher in relation to class objectives. The teacher should judge by the writers' sincerity and willingness to express truthfully what they see, by the order and simple progression of thought, by appropriateness of style, concreteness, and accuracy. Class and self-evaluation may be used, but the teacher must always evaluate also. Evaluation should include guiding learning, developing perception and responsibility, and supervising separate, continuous, and complementary evaluations carried on by individuals, their classmates, and other teachers.¹⁶

¹⁴ Edward B. Fry, "Glossing: an Ancient Method to Aid Social Studies Teachers with Reading Instruction," *California Journal of Secondary Education*, vol. 32, pp. 90-92, February, 1957.

¹⁵ "Some Suggestions on the Teaching of Creative Writing," *The Bulletin of the National Association of Secondary School Principals*, part I, vol. 39, pp. 53-58, October, 1955.

¹⁶ William J. Dusel, "How Should Student Writing be Judged?" *The English Journal*, vol. 46, pp. 263-268, May, 1957.

Integration in Writing. There are three aspects of integration which need attention in the teaching of writing: the integration of writing into the total of the language arts, the integration of writing into other areas of subject matter and interest, and the integration which nature takes care of in the interrelationship between ability to communicate and the development of personality. Four basic goals toward which we work in teaching writing are: ease, clarity, suitability, and originality.¹⁷

Oral Reports. All adults need the ability to express themselves well in speech. Students may be asked to name people whom they like to hear speak and then list criteria for good speaking. An oral report requires preliminary search for facts, organization, clarity of speech, and ability to interest the audience. Students may establish criteria for their own reports, such as use of familiar words, good grammar, and organization which stays with the subject.

Topics may evolve from class work; the report should be carefully timed. Types of reports are informal, formal, and group oral reports. Evaluation should follow immediately with class discussion of the contribution made by the oral report.¹⁸

Speech for Everyone. Speech reveals much of personality, power of thought, and emotional state. All teachers should help students to develop speech that is audible, intelligible, and pleasant to hear; to communicate ideas and feelings through speech; to develop technics for speaking in certain situations; to obtain special help when needed for speech problems. Practice and analysis are necessary. Teachers must be aware that speech and thinking may be developed side by side.¹⁹

* * *

The communications technic is a way of helping students to function more precisely and more creatively, and thus with more active thinking, in the fields of writing, reading, and public speaking. A large part of the technic is employed in assisting students to understand how to communicate ideas to someone else or how to receive a communica-

¹⁷ Ruth G. Strickland, "Integration, Its Implications for Instruction in Writing," *Journal of Education*, Boston University School of Education, vol. 138, pp. 28-32, October, 1955.

¹⁸ Myrtle S. Larkin, "How to Use Oral Reports," *Social Education*, vol. 15, pp. 239-243, May, 1951.

¹⁹ Magdalene Kramer, "Everybody Talks but How?" *NEA Journal*, vol. 45, pp. 561-563, December, 1956.

tion. Perhaps much of this technic appears mechanical; yet the implications of lack of ability in these areas are extremely far-reaching. Precise, accurate, and creative ability in communication marks the thinking man, in spite of Robert South's quip that wise men use speech to conceal thought.

The teaching of communication has too often been left to the teacher of English. Sloppy construction, spelling, and misuse of words have been ignored in both public speaking and writing, in such courses as history and chemistry, by the very teachers who berate the English department for failing to teach English. The method of approaching a geometry book has been ignored, and the student has been invited to plunge in and read if he is able; yet the same geometry teacher bemoans the fact that the English department fails in its job of teaching reading. A good teacher faces the situation realistically and agrees to assume his share of responsibility. He knows that communication must be taught in every classroom.

LEARNING MATERIALS

*Suggestions for Further Reading**

1. The Commission on the English Curriculum of the National Council of Teachers of English: *The English Language Arts in the Secondary School*, Appleton-Century-Crofts, Inc., New York, 1956.
2. Schramm, Wilbur (ed.): *The Process and Effects of Mass Communications*, University of Illinois Press, Urbana, Ill., 1955.

* See also the summaries under *Other Views* in this chapter. See also the list following Chapter 11.



10

The Small Group Technic

Sometimes a visitor to a school happens upon a class in which small groups of students talk earnestly together in little clusters about the room. The visitor might expect that if he eavesdropped upon one of these small groups, he would find the topic of conversation to be Saturday night dates or the batting averages of favorite baseball players. He would be astonished to discover that the six excited students were attempting to ascertain the strategy of Caesar in the Gallic Wars in a Latin class, or the use of a road map to plot stop-overs on a vacation through several states in a seventh-grade geography class. The visitor might be awed to observe such interest in topics which do not usually fall under the scrutiny of adolescents. But after eavesdropping on each of the groups, he would probably conclude that the small group technic helps students to feel success, gives them a sense of belonging, and encourages them to think together about matters far removed from dates and baseball.

Although some ideas in the chapter on discussion apply directly to small groupings, certain special aspects of the technic warrant separate consideration. The size of a small group varies little; there are usually from three to eight members. Thus the whole class may be broken into a number of small groups, all working at the same time, or one small group may present ideas and information to the rest of the class. One of the greatest differences between the talk in small groups and general discussion lies in the fact that the teacher no longer guides the group; the leader is a student. The small group technic means the subdividing of the class into small units in order to arouse anxiety, define problems, or pull together discoveries so as to form hypotheses. It takes the place of general class discussion.

Place of the Small Group in Critical Thinking

In arousing interest a "round table" might be employed, as it was in an English class which had undertaken a study of the dictionary. Several students agreed to discuss before the class the question, "Why not spell words the way they sound and pronounce them the way they are spelled, instead of using a dictionary, so that we can always be sure to be correct?" As one way of stimulating anxiety, the students discussed this question at a round table. Of course some time had been spent in preparation and in considering the question (and other possible problems) with the teacher before presenting the discussion to the class. A round table might have decided to discuss the question, "Does knowing derivatives of words make us speak and read better?" During the round table, students might be led to explore many new areas of interest.

Assuming that four members of an English class have engaged in a round table based on the first question above, and then that the total group has held a brief general discussion as a way of arousing anxiety, the teacher, Mr. J, could proceed to step 2.

"Now," he might say, "let's find out just exactly what we want to know about the dictionary, where it can help us, and how we can study it. In order to do this, suppose you break into groups of six. First, attempt to list all the ways that you have used a dictionary. All six, in each group, should make suggestions. Then, looking through a dictionary, see if you can find how it might help you to learn other

things. After you have made your list, suggest some possible ways to study the dictionary. Let's take about twenty minutes." If this were the first time the class had tried the small group technic, the teacher would continue with his explanation. "Each group will need a chairman to be sure that every member has a chance to offer his ideas, and to try to get agreement from the group on the ideas to present. The group will also need a recorder to write down the ideas and to present them later to the whole class. I'll walk around and help you wherever I can." This kind of small group is called a "six-six group" or a "buzz group."

At step 4 the small group technic is also used effectively. During research, such matters as etymology, pronunciation, past tense and plurals, spelling, understanding of abbreviations would be considered. Finally a "panel" might be formed of six interested students to discuss the matter, "How can one best remember the spelling and meaning of a word looked up in the dictionary?" The six students would discuss the question, each one presenting his hypothesis. Members of the class would add their ideas. Then the whole group would move to a final consideration of the place of their hypotheses in relation to other learning, and would attempt to formulate personal judgments.

Benefits of the Technic

The small group technic utilizes discussion but varies the approach from large class discussion at steps 1, 2, and 4 of problem solving. At times, small peer groups already formed may work together. At other times, by various devices of counting off in sixes—using the first or last names and dividing according to the beginning letter, using birthdays and dividing by months or by dates, or (as in panels) dividing according to special interests—small groups may be formed, which will develop new, close associations. Consequently love, security, a sense of belonging, and independence come into being in various subdivisions and groupings, and the warmth of feeling promotes general cooperation as all begin to understand one another in an informal, closely knit association. Groupings according to ability within the classroom are also a possible kind of subdivision, though they have questionable merit. The teacher should not strive for "homogeneity which cannot

be achieved," Cook says in an article based on current research.¹ However, an attempt at ability groupings once in a while may be helpful in varying the teacher's approach. Furthermore, if there are no administrative groupings, it may be a necessity for the teacher to subdivide his class roughly according to achievement.

Another possible way to subdivide groups has been pointed out by Moreno and others. He suggests spontaneous choice along sociometric lines.² This could be implemented by the teacher through the use of a sociogram.

Although research in the use of small groups is limited, except as studies of group dynamics by Moreno, Thelen, Muntyan, Gibb, Rosenberg, and others apply to such spontaneous and short-lived divisions, some benefits are obvious. The small group would seem to offer a special advantage to the shy and slow. With but a few other students to hear, these students often gain enough confidence to offer ideas and to participate. The teacher may be surprised to observe that Larry, usually uncommunicative, talks animatedly in the small group. As a matter of fact, a student rarely fails to assume a part in a small group, even though his hesitation may hamper him greatly in a general discussion.

The small groups are a part of the total class. When buzz groups are formed, each recorder reports back to the whole group. When panels and round tables argue a question, the actual discussion by the small group is heard by the larger class. Thus good opportunity arises for the sharing of leadership roles and for a feeling of success by many different students as they offer their ideas or the ideas of their group to the whole class. Joanna, shy and quiet, was asked to be recorder for buzz group 1 in the study of the dictionary. Later, when the time came to offer her contribution, she found security in the list of ideas already in her hands, for which others shared responsibility. With this new security, she was able to rise and offer the three suggestions of her group without hesitation: "The dictionary can help us to find synonyms for words we want to use in our writing. The dictionary can help us to check up on our spelling. The dictionary can help us to pronounce correctly. Our group thinks we should take one

¹ Walter W. Cook, "The Gifted and the Retarded in Historical Perspective," *Phi Delta Kappan*, vol. 39, pp. 249-255, March, 1958.

² Kenneth A. Benne and Grace Levit, "The Nature of Groups and Helping Groups Improve their Operation," *Review of Educational Research*, vol. 23, pp. 289-308, October, 1953.

or two new words and study every bit of the information given on those words to be sure we can use all that the dictionary offers us." Joanna sighed and sat down. She realized that when she presented a report or speech of her own, she was so uncomfortable that her knees shook, but that here, when the ideas were shared with others, offering them aloud gave her a new sense of success and belonging.

In the buzz groups, students who may not voice their ideas otherwise may learn to think with the group. They may come to realize what it means to express an idea and to hear others adopt or reject it; they may learn to verbalize thoughts which would remain unformed and without foundation otherwise. In the presentation-type groups—as the panel or round table—those who participate may discover that other group members pounce upon generalizations and cloudy ideas as a means of "selling" an opposing argument to the class. Listeners to the group presentation may also move toward learning in the same manner, if they have felt the problem which the group discusses, and may offer their own hypotheses and judgments later. Or they may gain new anxiety and form new problems during a presentation.

Some students may hesitate to participate in a presentation-type small group because they feel no security as a center of attention. However, if the participation of everyone in turn is an accepted procedure, and if a real sense of cooperation prevails, then each experience should become less painful. The effect of acquired ease and sureness may even carry over into later life. When a student is able to verbalize his ideas before a group, his sense of security should lead him to undertake such a role in business, in social and civic situations, as well as in the classroom.

Ability to verbalize enhances the learning of a given student in the small group, just as it does in general discussion. But this ability is usually less evident than in discussion for reasons already mentioned. The teacher must be alert to aid Stan and Herb and Fred, who do not verbalize well, and if necessary to help them through other technics where they function better.

An Example of the Technic

The round table is a discussion of a particular question among chosen students with the object of arousing interest in the subject. The

class does not participate during the discussion. In the round table organized at the beginning of the study of the dictionary, four students, as we have seen, agreed to consider the question, "Why not spell words the way they sound and pronounce them the way they are spelled instead of using a dictionary?" The students were Robie, Charles, Donna, and Linda. Robie and Donna agreed to argue in favor of the question and Charles and Linda against it.

ROBIE: Just think how handy it would be for everyone if "weigh" and "way" [spelling each] were spelled the same. And then there is "eight" which is consistent with "weigh," but "height," which looks the same, is pronounced differently.

CHARLES: But if "weigh" and "way" were spelled the same you would have trouble distinguishing between them. "Read" (to read aloud) and "read" (to have read) look the same but don't mean the same. If everything were alike, we wouldn't be able to read at all.

LINDA: Anyway the question is absurd because you either have to spell the way words sound or pronounce the way words are spelled. You would have to start one way or the other. You couldn't do both.

DONNA: Some attempts have been made to simplify English, and if everyone followed this simplified English, after a while common usage would make the dictionary adopt it. I think we should ignore the dictionary and be simple.

ROBIE: I agree. I can't remember "leisure" and "deceit." The old rule about the letter c doesn't apply with "leisure."

CHARLES: But we can't suddenly ignore the dictionary. We couldn't understand one another. Here is a letter I wrote. [He holds it up for all to see.] "I ce you hav waed th red red agenst th l I I red about; did you red al th pros and cons when you red the paper?" What it says is, "I see you have weighed the red reed against the one I read about; did you read all the pros and cons when you read the paper?" Or how about this poem? [Again he holds up the paper requesting the class to read aloud.]

The new gnu met the old gnu
And the new gnu knew
The old gnu knew the new gnu
Was a new gnu at the zoo.³

³ Maud F. Jackson, "The New Gnu," *Child Life*, vol. 36, p. 17, May, 1957.

DONNA: It wouldn't have to be that bad.

LINDA: I think we should just take words as they are and maybe try to find out why they are spelled and pronounced as they are. That should help us to remember. Then maybe we could try to work on changing one kind of mix-up at a time.

Thus the round table stirs up many areas of interest in the minds of the class members. They begin to think as they become aware of possible problems.

At this point let us assume that the teacher breaks the class into small groups, chosen at random by first names, suggesting that the groups attempt to define the problems to be discussed. As he moves from group to group, he finds that Nancy sits and listens to her companions in the group but obviously offers nothing.

He asks the group, not Nancy at first, "How are things going?"

Someone tells him about their plan for taking one familiar and one unfamiliar word for each letter of the alphabet and studying it. The teacher then turns to Nancy.

"You don't seem to be saying much, Nancy. You think this plan of your group isn't very good?" Here he attempts to reflect her feelings.

"Oh no. It's fine."

"You mean it doesn't interest you very much?"

"Any way you look at it, studying the dictionary will be boring."

"You can't find any reason for doing it, then?"

"Well, I can see it might have its points."

All this time the teacher is recalling what he knows about Nancy. She is intelligent, with no real academic problems, no adjustment problems that he is aware of, and her socioeconomic background should lead her to need to spell and pronounce correctly.

Finding no definite clue to her silence, he persists, "You think it might have some value, then, but you don't want to work at it?"

"Well. I'll give it a try, I guess."

Here the student has thus far been unwilling to work hard to find out something, even when she felt a need for it. In other words, the value she placed on ease was greater than the value she placed on finding out. The teacher has tried to help her to evaluate the standards she holds. This approach will often impel a student out of apparent lethargy into the activity of thought.

Planning and the Teacher's Role

The teacher is an active participant in small groups as a background and resource person. He speaks only to suggest material for research or to give directions for procedure during buzz groups, or, when chairman and recorder fail to keep a student to the point, he may need to rephrase the question under consideration. In the presentation-type group he says nothing except when he feels he must rephrase the problem. During a presentation, if a student is obviously mistaken in the information he presents, or if an attitude remains unchallenged as though it were information, the teacher writes himself a note and corrects the error later. Only when uninterrupted can students gain a sense of security in a situation where they are under the spotlight of attention with all eyes focused upon them.

The teacher is nevertheless active. We saw evidence of preplanning, for example, in the round table on the dictionary; Charles had written out sentences. We saw evidence of preconsidered information; Donna knew something about simplified spelling. Before the round table, Mr. J spent about fifteen minutes with the small group. He helped the students to identify the roles they were to play, to define the function and purpose of the round table, and to understand the position each was to assume on the basic question. Then Mr. J offered a list of books which contained ideas about words and their use. He recommended that the four students consider words which sound the same but look different, or which look the same but sound different.

"With these ideas in mind," he concluded, "all you need to do is to engage in a general discussion among yourselves. You know you should agree that one of you is to be particularly responsible for keeping on the topic, in other words, is to act as chairman. Of course all of you must be careful about sticking to the point. At the end, one of you should be ready to act as recorder, that is, to present the conclusions agreed upon or the positions taken."

Sometimes the students themselves will recommend the use of small groups for one phase of problem solving. At other times the teacher may ask whether the class would care to subdivide into groups or whether one small group would like to act as a panel or round table or symposium, as the case may be. The teacher must comprehend the functions of each small group. He must also help the class to define

the various roles played by small group members. These roles are identical from group to group; the only variation is the use, particularly in debates, of two recorders, one for each opposing side.

The role of chairman needs consideration. In a small group he has two major functions: including the ideas of every group member, and keeping the group to the point. As the class becomes aware of the aids to clear thinking, the chairmen may be asked to emphasize one (such as carefully considering generalizations) during their small group meetings. Here is a means of calling attention to these aids, so that eventually students will employ them all without conscious thought. If there is to be a question-answer period, as after a panel, the chairman is responsible for conducting the interchange of ideas.

The role of recorder must also be defined carefully. The recorder must first review the purpose of the small group. "This buzz group is to decide what we want to know about chemical processes used to bleach different materials such as paper, cotton, and miracle fibers, and how we shall find out." The recorder reemphasizes the purpose of the small group and records all ideas which directly answer the basic question. This sort of small group would be useful during step 2 of problem solving. Or during step 4 an informal debate might be used, and here two recorders would review the purpose of the small group, "Resolved: that the United Nations should strengthen UNESCO." The recorders' second role would be to record the main points of the arguments, the recorder for the affirmative summarizing his side and the recorder for the negative summarizing his. When the group wanders from the topic, the recorder may need to remind them of their purpose by repeating the resolution. Often three or four such statements are necessary to help all group members to grasp the exact purpose of the debate or panel or buzz group. The talented teacher may awake to the realization, after a number of attempts with small groups, that their purpose must be precisely and clearly written down in a form which precludes ambiguity. This is the statement which the recorder holds and which he rereads at intervals to his group. Students will flounder unnecessarily if they feel uncertain of the exact problem they should be studying and discussing.

The teacher should also stress the roles of the group members. In an informal group, each person is expected to offer as many ideas as he can. The chairman may request ideas from a nonparticipant. (In an

informal situation the pressure is not so great that an individual loses a sense of security thus.) In groups where opposing sides are assumed, the student must be certain of his position and offer every argument he can muster in support of it. Finally, the exact machinery and purpose of a given small group will need review so that students may know the procedures of their round table as opposed, for example, to a forum.

In a study of current research in group dynamics, Benne says that in group membership training, use of self-diagnosis is recommended by many researchers. Jenkins suggests this be done by discussion with the group, and Rosenberg, by role playing.⁴ Such approaches should help improve member roles through evaluation.

In addition, the teacher may need a plan for choosing chairmen and recorders. Probably the best scheme to promote cooperation is to allow the students to choose, with the stipulation that "it must be someone who has not had the job so far this year," or "in the past month." In this way freedom of choice exists, yet each student in the class has an opportunity to serve in the two roles and so to enhance his own sense of belonging and security, as well as to improve his own thinking, and to acquire the gratifying sense of helping others to improve theirs.

Buzz or Six-Six Group

The name six-six is derived from the use of six group members who talk together for six minutes to consider a particular question. It is sometimes known as the Phillips Method because J. Donald Phillips of Michigan State University has publicized it. This kind of small group differs from the presentation type in that all students in the class may engage in small groups at one time. One variation in the buzz group is for all recorders to meet together and to offer a joint report to the whole class in place of each one offering his group's decisions in turn.

The buzz group might be used effectively in arousing anxiety as well as in defining problems and deciding how to solve them. In order to start anxiety at the introduction of a new unit, the teacher would say, "We have now come to a crucial point in our study of the history of the world. Something new is created at this point which completely alters the course of civilization. Get together in sixes. Let's do it by

⁴Benne and Levit, *loc. cit.*

birth dates, one to four in that corner, five to eight in that (and so on). Talk about this topic and try to think of everything you can about it: 'How do machines change the world? How do they affect my life?' Later we shall try to define problems relating to this topic and see how we shall go about solving them."

It is in defining problems that buzz groups work most often in the classroom. The teacher in the world history class, after the recorders have presented their ideas at the end of step 1, might suggest that the class return to the buzz groups to define problems and ways to solve them.

Presentation-type Groups

All small groups other than the buzz group are of the presentation type. They are used in stimulating anxiety or forming hypotheses. We have already described the round table for arousing anxiety in the study of the dictionary. At step 4 a symposium might present ideas. In a civics class, several students represented the class, in a cooperative attempt with students from another school, to study the differences between town and city government. The students from the town spent a day in the city government offices and vice versa. On their return to the civics class, the town students presented their hypotheses and conclusion, each in his turn. Each one had journeyed to the city with one special aspect of its administration to observe (the board of aldermen and their roles as representatives of city citizens, for example), and it was this aspect which he described at the symposium. At the end of the formal presentations about the city government, the chairman asked the symposium members to discuss together their most vivid impressions. Finally discussion was opened to the class for their questions and observations.

In a less formal situation during research, students who have subdivided a large original problem into several areas of study for investigation by a number of small groups will present their findings to the total group. Here a series of panels may be employed. For example, students in geography may agree to separate a study of Canada's tourist attractions into provinces, each group investigating one province in trying to answer the question, "Where would you want to visit or live in Canada?" At step 2 the problem may be defined as, "Where

would I want to visit in Canada if I could take a trip there?" Then at step 4 each of these groups may become a panel to proffer its hypotheses to the class, with the opportunity for class questions after the several presentations.

We turn now to a more detailed consideration of the different types of small groups. It is to be remembered that the role of recorder and chairman are necessary to each group. No small group should function without at least one of each, and sometimes a group may need two recorders.

Panel. A panel, say McBurney and Hance, contains three elements, the panel members, the chairman, and the audience.⁵ The panel was originated by Harry A. Overstreet, and it is used widely today in many kinds of meetings. The young people in schools may be lured into participation in panels as a result of viewing the many which are current on television.

The members of a panel discuss the question among themselves, the chairman seeing that everyone is heard from and that the members stay within the allotted topic. The panel members on Saskatchewan or Ontario, for example, discuss among themselves what they have found out about these provinces, where they would most like to visit, and why. Then the audience is free to ask questions. Again the chairman plays the role of directing, restating questions where necessary, and redirecting those which stray from the matter under examination.

Round Table. The round table differs from the panel in that although the members discuss the subject among themselves, the audience does not participate. "The round table is intended primarily as a public discussion to inform and to interest a group of people in a particular issue."⁶ The round table, as in the example of the study of the dictionary, would be used almost exclusively to arouse anxiety, whereas the panel would generally be used at step 4 to inform the whole class of ideas gained by the small group.

Symposium. The symposium is slightly more formal than the panel and takes one extra step. The first part of the symposium is made up of prepared speeches or talks by each group member in turn, as in the

⁵ James H. McBurney and Kenneth G. Hance, *The Principles and Methods of Discussion*, Harper & Brothers, New York, 1939, p. 288.

⁶ Waldo W. Braden and Earnest Brandenburg, *Oral Decision-making*, Harper & Brothers, New York, 1955, p. 304.

symposium in the civics class. Afterwards, the general discussion among group members follows, and finally the audience asks questions. Except for the prepared speeches, the procedure is like that of the panel. When students have worked in small groups for research, they may at times subdivide their group and each member pursue one particular aspect of the subject. For example, in the geography class which undertook the study of tourist attractions of Canada by provinces, one student in the group on Quebec Province might consider educational institutions, another might consider churches and cathedrals, and one might investigate the special attractions of Montreal. Then in the symposium, each student might offer his special bit of information, prior to the small group's discussion about the tourist attractions of Quebec Province. Finally, the class would be free to ask questions and to comment.

Forum. The forum has still a different emphasis from the others. It is generally made up of four members who offer formally prepared statements of certain points of view. The forum presupposes an issue with possible arguments. A class in English which was studying Shakespeare defined a problem relating to the identity of the author of the plays and poems. Four students engaged in research on the problem, each reading an argument for one theory among several, i.e., that the author was Shakespeare himself, that he was Francis Bacon, that he was a woman in disguise, or that, though no one really knows who wrote the works, it is unlikely that a relatively unschooled actor like Shakespeare could have done so.

In the forum, each student offers his findings relative to the original problem. Then the members query each other. Finally the audience may ask questions. Unlike the panel and the symposium, questions from the audience must be directed toward one of the individuals in the forum. Finally the recorder summarizes the various points of view. Usually a forum is based upon only two opposing points of view. In the discussion about the authorship of Shakespeare's plays the four members might take sides, arguing either that Shakespeare wrote the plays or that he did not. Then the two opposing sides would attempt to show where the other side had erred in its statements and opinions. Mills says that this sort of presentation is sometimes referred to as the "Town Hall Meeting Forum."⁷

⁷ Hubert H. Mills and Harl R. Douglass, *Teaching in High School*, The Ronald Press Company, New York, 1957, p. 198.

Debate. A formal debate holds little place in the classroom today, though occasionally an informal debate may be helpful. One book declares that an informal debate may take any form "so long as those for and against have an equal opportunity to present their views."⁸ In a debate, the procedure is more formalized than in the forum. The latter allows each member to speak, then gives free opportunity for questioning among the group members, and then finally opens the discussion to the class members. The debate allows each member to speak, as in the forum. After the speeches, a question period usually allows each opposing side to ask questions for a certain length of time. Finally each side offers a summary. Unlike the forum, a debate allows no audience participation. The kind of question which is debated is generally one which makes recommendations for the future. In place of the question about Shakespeare, which fits the forum very well, a question to be debated might be, "Resolved: that Shakespeare should be studied during three years of high school."

In debating this question, the two or three students for the affirmative would present their case, then the two or three for the negative. Next, the affirmative would interrogate their opponents for three minutes and vice versa. Finally the affirmative side would summarize for three minutes, offering summary arguments supporting the study of Shakespeare during each year of high school. Then the negative would summarize for three minutes, showing why Shakespeare should not be studied in high school, or why he should be studied for only one or two years. This would close the debate. The teacher would then, as in every other small group, move into step five and the forming of judgments to aid the total class to form hypotheses and decisions about studying Shakespeare.

Other Views

Again we summarize articles by other authors in an attempt to add to present learning both quantitatively and qualitatively, and to offer a few new examples of the small group technic.

Ability Grouping. Two classes of forty-five students each were divided into three groups according to ability, as judged by past achievement, intelligence, and reading ability. Each group was given a different problem. Group 1, high students, were given extra work; group 2,

⁸ Braden and Brandenburg, *op. cit.*, p. 372.

average students, were given extra time; group 3, below average students, were given half as much work as group 1. All groups liked the plan, especially group 3. According to the author, superior biology students like the opportunity for higher learning, greater belonging, and more effective teaching.⁹

Groups in Teaching Literature. Teaching literature may be accomplished through groups of six. The uses of the groups may differ. The class may be grouped to study a single selection which will appeal to all, or groups may report to the class their ideas on individual reading; groups may read according to their ability level; or they may work on different literature but on a common theme.¹⁰

Literature and Group Dynamics. One class was divided into groups of six. In a certain time the groups were to read 150 pages and also to engage in other reading, writing, and speaking. Each group chose a leader, but individuals were allowed to work alone provided they participated regularly. The groups also wrote plays, reports, and radio programs, and presented different programs to the class.

The groups found the value of planning together, meeting obligations, and sharing an experience. The series of programs were followed by critical discussion.¹¹

Interest Grouping. In a fourth-year English class, the teacher divided the students according to their interest in reading books about animals. The teacher and librarian suggested many different books. Then the students read stories pertaining to animals and later discussed their ideas in the small interest groups. The chairmen made informal reports to the class on the kinds of stories discussed; later the class summarized and evaluated the learning about animals.

As a large group the class discussed the results of their experience in this reading—how it had affected them. They also evaluated their reading for itself, discussing the honesty of the ideas, the excitement of the stories, the portrayal of heroes, and the description of animal behavior.¹²

⁹ Kenneth Hoover, "An Experiment on Grouping within the Classroom," *California Journal of Secondary Education*, vol. 30, pp. 326-331, October, 1955.

¹⁰ James R. Squire, "Individualizing the Teaching of Literature," *The English Journal*, vol. 45, pp. 314-319, September, 1956.

¹¹ Mary Baloyan, "Enjoying Literature More Through Group Dynamics," *The English Journal*, vol. 43, pp. 308-312, September, 1954.

¹² Arno Jewett, "Meeting Differences Differently," *NEA Journal*, vol. 42, pp. 270-271, May, 1953.

Breaking Down the Class. The group ought to be divided according to pupil interest, regardless of equality of numbers in each subgroup, in order that students may learn the ways in which group size determines effectiveness. In this way some would learn that the effect of mixed interest in a group plus unwieldiness of size is frustration of action; some would see the handicap of too few opinions; some would see the difficulty of one individual attempting to maintain identity in the face of dominant beliefs; some would learn of the deadlock which results when opinions are weighted equally. The effect of the group work would then be rewarding, as students would learn that ideas are influenced by social environment.¹³

Groups in History. At the beginning of a course in history, in order to demonstrate a practical experiment in democratic living, the teacher introduces the subject and then the class divides into groups of eight according to interests. They plan their work together. Each group has a chairman and an observer plus other helpers, including a librarian. The teacher supervises the groups. The groups report on their progress, and the teacher works directly with them.

The advantages of the approach are that individuals are reached personally. Within the group the students gain confidence by working together; all students are encouraged and helped. All students must consult many references and no single text is used; so pupils gain more than one view of a subject. The author gives criteria for evaluation of groups, as well as a list of suggested topics.¹⁴

* * *

There is no doubt that the means used in the small group technic is discussion; therefore almost everything we have said in the chapter on discussion applies to small groups. Only the teacher's role is different. In the small group, though his role is extremely important, he foregoes the direction of the discussion. His contribution lies rather in deciding what kind of small group is called for, in directing students how to learn in the small group, and in offering them resources and ideas to spark their discussions.

The use of the small group technic in the classroom is not a vital

¹³Daniel Roselle, "Break Up the Social Studies Discussion Group!" *The Clearing House*, vol. 28, pp. 332-333, February, 1954.

¹⁴James Hogan, "The Group-Unit: An Approach to the Teaching of History," *The Social Studies*, vol. 45, pp. 13-18, January, 1954.

matter. If the reader finds little value in the information and attitudes offered here, his failure to utilize the small group technic will not mean his failure as a teacher. Nevertheless, it remains a helpful and useful technic.

Perhaps one of the greatest advantages of the small group technic is that it involves every student. Patty may not sit and daydream. Ronnie may not design cars in his notebook. Instead of the anonymity of being surrounded by a large number of students and thus being left to whatever is on adolescents' minds, Patty and Ronnie find they are left unprotected and unsurrounded. Because they want to belong and to feel success, they usually develop greater desire to share in the responsibility of the small group.

The small group technic has left the classroom today. It has invaded entertainment, particularly television, and it has invaded business and industry. Much of the world's important business, both monetary and humanitarian, is being determined through small groups. The student who has practiced in this medium and who has benefited from the teacher who teaches through the small group technic, should be better able to participate in the world's small groups and in the work they decide to do.

LEARNING MATERIALS

*Suggestions for Further Reading**

1. Braden, Waldo W., and Earnest Brandenburg: *Oral Decision-making*, Harper & Brothers, New York, 1955.
2. McBurney, James H., and Kenneth G. Hance: *The Principles and Methods of Discussion*, Harper & Brothers, New York, 1939.

* See also the summaries under *Other Views* in this chapter. See also the list following Chapter 11.



11

The Lecture Technic

Perhaps we shall be condemned for allotting space to the lecture technic, for it is notably of dubious repute. If we could hear a lecture by a Demosthenes or a Jonathan Edwards, however, few of us would call the technic poor. And even the less inspired teacher, if he possesses or forces himself to gain a touch of the dramatic, may make good use of the lecture. His attitude and plan will determine his success. They will decide whether his lecture sounds like a delivery by William Lyon Phelps or whether it is more likely to send an audience into oblivion. We remember how Bernard Shaw defined a nap. "A nap, my friend, is a brief period of sleep which overtakes superannuated persons when they endeavor to entertain unwelcome visitors or to listen to scientific lectures."¹

Educators say little about the lecture technic in teaching. When it is

¹ Bernard Shaw, "Tragedy of An Elderly Gentleman," in *Plays Back to Methuselah*, Wm. H. Wise & Co., Inc., New York, 1930, p. 137.

mentioned in educational writing, it generally meets disapproval. Yet these same educators teach technics to teachers by means of the lecture. It holds a definite place in a teacher's repertoire of technics, and our purpose in this section is to help the teacher to develop this approach for use at various levels of thinking.

Types of Lectures

The lecture technic in the secondary school manifests itself in several different forms. There is the well-planned formal lecture where no audience or class participation is invited during the lecture period. The student listens and may take notes. This formal lecture lasts usually more than thirty minutes and may be delivered by a teacher or by a guest speaker. Preferably, it occurs only occasionally. Secondly, there is the informal lecture, which invites audience participation either during or directly following the talk. This approach involves the student as a partner in learning. He questions the lecturer, who in turn clarifies any misunderstandings or deals with any concerns which may have arisen. Such a lecture may last ten minutes or a full class period. The lecture-demonstration, the third kind of lecture, in most secondary school classes involves student questions also. Another kind of lecture is described by Risk, who distinguishes with some justification between the lecture technic and the "telling" technic which high school teachers use.² It is when the teacher prepares and plans for a brief five- to ten-minute talk, or when a teacher obtains the attention of the entire class to clear up a difficulty, that he delivers the fourth kind of lecture. This is a brief, informal talk; occasion for its use arises frequently.

Lectures may therefore be divided into at least four forms, differing according to their place in problem solving and consequently in their purpose. The lecture, in essence, is speaking by the teacher and sometimes by an outsider, usually for no more than fifteen minutes, about a topic, a fact, an idea, or an attitude, to a body of listening students, who may occasionally interrupt the speaker with their questions. We have previously discussed the demonstration approach in the chapter on multisensory aids, and therefore shall not consider it further.

Miss S may want to talk to her students during a whole class period

² Thomas M. Risk, *Principles and Practices of Teaching in Secondary Schools*, American Book Company, New York, 1958, pp. 248-249.

about the life and achievements of Louisa May Alcott. Miss S may feel a strong interest in Louisa Alcott and may think that a lecture on what she has learned about the author will serve as a background for the short period of time to be spent on *Little Women* by the class. Miss S proposes to introduce a new learning situation, so that her class will perceive their personal relationships to the new book and author, and will be ready to define what they want to learn.

Mr. M wants his class to understand a new method for solving simultaneous equations. He uses a lecture-blackboard demonstration for about fifteen minutes to help the class to perceive the relationships between old and new approaches. His purpose, like that of Miss S, is to call forth anxiety. He pauses during his lecture-demonstration to answer questions from his class.

Mr. Y's class in history had been discussing their hypotheses about a class problem in buzz groups, the defined problem being concerned with the causes of the economic collapse in 1929. As Mr. Y visited with the several groups, he realized that each group, concentrating on attitudes and information which were concerned only with the political aspects of the collapse, blamed the entire debacle on the Republican party. He called the class together and lectured for ten minutes, returning to step 3, on other causes they might consider and investigate. In other words, he helped the class to see that further research might contribute other information useful in solving the problem. He might have achieved the same end with each group alone, but he saved time with a brief informal lecture.

Miss S, Mr. M, and Mr. Y used the lecture technic either to arouse interest or to offer new ideas and information at times when the students experienced difficulties. We may say, then, that questioning, giving assignments and simple directions, answering student questions, and discussing ideas do not constitute the lecture technic. On the other hand a brief five-minute talk with the purpose of introducing a new idea, and a five-minute summary at the end of the class period would be classified as lectures.

The Lecture in Critical Thinking

Research has spent time in distinguishing the values of the lecture from those of the discussion. The results are often contradictory and

not always helpful in assessing the worth of the lecture for a given teacher. For example, a study by Ruja found that students who had participated in discussion did not surpass, in their grasp of subject matter, those who had listened to lectures. Use of the Bell Adjustment Inventory showed no significant differences in adjustment gains for the two, though the instructor was considered somewhat more favorably in classes conducted by discussion, and students in discussion got to know one another better.³ However, these results may be contrasted with a study by Ward who found distinct differences according to student ability.⁴ In general most experimenters, such as Bane and Carlson, have found the lecture and discussion to be about equally valuable in recall-and-recognition learning, whereas discussion is superior in promoting retention and synthesis, and in developing attitudes. Most experimenters, however, have not viewed the lecture as a part of the problem-solving process, and most experiments are at the college level. They do not invalidate its use as we portray it here. Research is needed on the lecture in the secondary school.

Like other technics, the lecture fits some steps of critical thinking and is of particular importance in summarizing for steps 4 and 5 and for judgments.

Step One. The first phase of problem solving for the student involves an introduction to the new topic in terms of scope, content, and relationships, as well as the development of anxiety about it. The lecture is one means of accomplishing the preliminary aspects of learning. Miss S attempted to build an acceptance of Louisa May Alcott as an author. She helped the class to feel emotionally ready for the reading of a book. She aroused anxiety which would lead the class to define reasons for undertaking the study of *Little Women*.

Thus circumstances in a secondary school teaching situation may arise which will prompt the teacher to use a full class period or (generally) a briefer period of time, to build an awareness of the problems to be studied. Other technics accomplish the same purpose, but at times a teacher can personalize a new topic better through the lec-

³ Harry Ruja, "Outcomes of Lecture and Discussion Procedures in Three College Courses," *Journal of Experimental Education*, vol. 22, pp. 385-394, June, 1954.

⁴ J. N. Ward, "Group Study vs. Lecture-Demonstration Method in Physical Science Instruction for General Education College Students," *Journal of Experimental Education*, vol. 24, pp. 97-210, March, 1956.

ture than through discussion or other technics. This is especially true when the teacher has experienced a personal involvement with the problem to be undertaken, as Miss S had in her extensive study of Louisa May Alcott.

To help pupils at the junior high school level to gain interest in a new unit on westward expansion, Mr. B decided to present a fifteen-minute lecture on the contrast between a journey taken by a modern family in moving its home from the East coast to California and such an excursion in the 1840s. He told about a family he knew, who moved thus to California, and about their two-week trip across the United States. He introduced many problems out of his comparison of past and present, and named possible areas of investigation. He suggested that girls might be interested in food and clothing and boys in safety measures and modes of transportation. As he developed his lecture, emphasizing needs in as many problem areas as possible, his young people made comparisons and attempted to visualize themselves traveling in the present and in the 1840s. Thinking of their own need for physical comfort, some of them perhaps wanted to discover what comforts, if any, the wagon-train travelers enjoyed. Other students thought of their desire for security and safety and developed concerns about Indian attacks and disease. Others satisfied their need for belonging by imagining themselves taking an active part in one of these wandering groups. Many were excited by the chances, in 1840, for independence and varied experiences. The lecture covered reasons for moving westward today and a century ago, thus touching areas of vocational, moral-religious, and economic problems. Mr. B helped pupils to feel a new concern and to consider possible problems relating to the new unit.

Let us suppose that a small group of students in this class are restless and inattentive. The teacher, during the lecture, makes as many allusions as possible to needs and developmental problems, thus hoping to awaken their anxiety. If the students are quiet, though inattentive, he may continue, moving later to this group and attempting to reflect their feelings about the study. "You think my ideas about a trek west are pretty old-fashioned? Now if you went, I imagine you would pay a visit to Matt Dillon!" He hopes thus to arouse their interest in another way.

If the group had been noisy and disturbing, the teacher might have

stopped his lecture, offered the group a list of movies and books about the Far West, perhaps, and asked them to find some which would be appropriate to the class study. The teacher knows that some students find it more difficult than others to listen and absorb, and he must be prepared with alternative technics for them, even as he attempts to explain to them how to listen intelligently.

Other teachers also use the lecture approach to arouse anxiety. The English teacher lectures on the topic, "Who has anything to write which is really worth telling the world?" with the purpose of helping each student to identify himself with personal reasons for writing. Perhaps this teacher emphasizes the idea that most students start to write without any reason. Lester says to himself, "That's what I do." He becomes interested because he sees that a report he must write in history may be a means to success immediately and in the future. After the lecture Lester decides to study further the value of a purpose in writing, and thus he has defined his problem.

The lecture, then, can be efficiently used to help students gain an awareness of the problems that concern them, provided the teacher consciously emphasizes needs in as many problem areas as possible. Such interests may also arise from listening to a lecture by a guest lecturer. One class in current world affairs at the senior high school level invited foreign students from a nearby university to be guest lecturers at the start of the unit on each new country; they hoped to be better able to define problems for study in the various countries after hearing about them from their own people.

Step Three. Lester, who realized his lack of a purpose in writing, was able to define his problem during or just after the teacher's lecture. The lecture is not a tool to define a problem for the student; the student must define his own problem in his own words and feel it in terms of his own needs. Too often in the teaching process teachers have attempted to define problems for students, and it is only by accident that the teacher-defined problem is also that defined by the student. The talented teacher does not tell students their difficulties, but helps them to understand and state their problems, after they have considered all information available to them, some of which may come from the lecture.

The lecture-demonstration and the lecture-with-questioning are approaches used in helping students to gain information for research. The

lecture-demonstration in algebra, science, and the practical arts commonly supplies students with information which helps them to solve their defined problems. In mathematics, students may watch and hear how to manipulate letters, numbers, and equations by use of the chalk-board. The science teacher lectures and demonstrates use of equipment and supplies, usually as a basis for a laboratory experience.

A mathematics teacher's class has phrased a problem of how to use a slide rule, having watched their teacher with one on many occasions and observed his speedy calculations. They discuss the use of the mechanical aid as a means to greater success with many kinds of mathematics. They have defined the problem and asked the teacher to demonstrate the procedure. The teacher presents, at step 3, a lecture-demonstration on how to multiply on a slide rule, and as a teaching aid uses a large six-foot wall slide rule. The students, manipulating their own slide rules, follow the teacher and ask questions about counting units and reading scales. The young people thus learn how to solve their problem of using the slide rule.

It is a teacher's function to teach, and to some this implies showing pupils "how-to-do-it." Most teachers who constantly demonstrate procedures fail to help pupils to define their own real problems. The English teacher may tell students how to write a good paragraph; the language teacher may tell how to conjugate German verbs; the speech teacher may lecture and may demonstrate good speech habits before his class. When teachers lecture and demonstrate the "how-to-do-it" aspects of their subject, they must be sure that the student understands how the demonstrated procedure is related to his own defined problems. He must see that the only role of the teacher at step 3 is to provide part of the information needed in his research as he attempts to solve his own problem.

The teacher may, however, realize a need to return to step 2 and carry on further discussion with the class of possible ways to approach step 3. Or, when information and attitudes appear lacking at step 4, he may return for further information at step 3. Mr. Y, in the class which was trying to find reasons for the 1929 stock market crash, returned from step 4 to a lecture at step 3. The class already knew their means for solving the problem—through small group discussions and research. Mr. Y, discerning a class difficulty, stopped the group work to provide further information.

Steps Four and Five and Judgments. After research is complete, it is a student's responsibility to pull together his findings to form his own hypotheses. The teacher should probably use the lecture technic as he summarizes hypotheses and appraisals. This type of lecture summary occurs after student discussion has established all possible relationships to other learning, and is generally a necessity if the students are to learn to appraise their efforts and gain a sense of success in the process of problem solving. Through the lecture the teacher helps students to realize that learning is not the solution of one problem on top of a preceding one. It is the building of learning and its relationships, with each problem solution adding new resources and starting new anxieties for the coming areas of study.

Referring again to Mr. Y's group discussions and research on the reasons for the 1929 financial decline, we realize that the teacher might have summarized in a lecture. Mr. Y might have spoken as follows:

We have been discussing and doing research this week on the reasons behind the 1929 financial crash. You felt this topic was worth investigating because you have heard a lot about job security and old age security from your families, and you wonder if such a crash could happen again and shatter your dreams of security, of personal comfort, and of success in college and in future jobs. You stated that if perhaps you were aware of causes and results, you might each be in a better position to help your country, and thus yourselves, to avoid another such occurrence. In keeping track of your group reports, I find that you have fairly well investigated and formed hypotheses in the following areas."

Mr. Y elaborates, and lists them on the board.

I feel that your ideas would be well received by historians and economists, and I personally tend to agree with group four that conditions today differ from those in 1929 in several essential ways. You have also considered the place of your hypotheses in future learning, particularly as they might apply to similar conditions today. You have been careful, too, to agree that further testing of your hypotheses will be necessary before you can be at all sure they are right. We turned, last of all, to your own personal judgments in relation to the situation in 1929, and you listed them in your notebooks as a record of your ideas at this point. Again I hope you will remember that your judgments are tentative and must be tested wherever possible.

He paused for comments, then continued:

Our next unit covers a period that was called the New Deal, from 1932, the year Franklin D. Roosevelt was elected President, to the start of the Second World War. The material we have studied this past week has a bearing on our new material because it was during this New Deal period that attempts were made to change the conditions which caused the 1929 crash, and to take steps to place our country and its people on a more secure financial footing. Many new ideas originated during President Roosevelt's first and second terms of office. At the same time, many family hardships continued. As an example, your parents or grandparents were probably making only as much money per week as they now make per day. I think it would be helpful to our next unit if each of you would tell your parents tonight that we have been discussing this week the causes of the 1929 crash and get their reactions; then you might ask them to tell you about their lives and problems during the middle and later thirties. Tomorrow we might start with your parents' reminiscences, as we try to bring to light the problems that you would like to investigate during our study of this exciting period of our history.

Thus Mr. Y uses the lecture to help in providing a transition from one learning experience to a new one. The process then starts again; that is, students awaken to anxiety and to new problems, and then, seek their solutions to arrive at a point of new learning.

Research is meager on the technic of lecturing. "We need to know more about different methods of organizing and presenting lectures; and the optimum length for different ability and age levels has not been established."⁵ Thus at present we must rely on commonly accepted hypotheses and promote research in all of these areas.

It is obvious that the lecture is one technic which may be adapted to very large groups. For example, Newton, Massachusetts, High School has experimented with a lecture given before a large audience composed of many groups of students, but has followed this with divisions into regular classes, and in some cases laboratories.⁶ If a really fine lecturer is available, or if a guest speaker who is both an expert and a good speaker may be secured, such opportunities should not be missed. Anticipating a lecture, the regular teacher would pursue the usual process of arousing anxieties and helping the group to formulate problems; afterward, he would ask the group to return to further research

⁵ Thomas F. Stovall, "Lecture vs. Discussion," *Phi Delta Kappan*, vol. 39, pp. 255-258, March, 1958.

⁶ *The Bulletin of the National Association of Secondary-school Principals*, vol. 42, pp. 280-282, April, 1958.

where it is warranted, or would lead them directly to hypotheses, appraisals, and judgments. Such a procedure should prove worthwhile for critical thinking, as long as it is related directly to student problems. The same scheme may be applied to the use of television and movies for large groups. These are the only technics adaptable to large groups.

Oral Reading

Reading aloud to a class or telling them a story is a popular technic of teaching. It may be employed for many reasons. Perhaps the teacher has a book not available to the group. He may read poetry or drama or tell a good story because he wants to arouse anxiety. Language teachers often read stories in a foreign language, tempting the class to follow, in the hope that they may acquire vocabulary and information useful in research. Pupils often learn how to read with meaning by following the teacher as he stresses important sentences and concepts. They learn, too, certain skills, such as how to read poetry correctly. Thus the lecture technic might be said to include oral reading and story telling, since these pleasant and natural activities are used as is the lecture.

Circumstances Which Produce a Good Lecture

A good lecture is produced by a combination of circumstances. The lecturer must have something to say and must plan it well; he must have an effective delivery and the ability to refer often to student problems. The pupils must be able and ready to respond; and they must evaluate the lecture by critical discussion and action.

Planning the Lecture. A teacher should not attempt to ad-lib a long lecture, but should plan so that it contributes to the problem solving needed by pupils. The talented lecturer, with this purpose in mind, outlines a lecture for stimulating anxieties and may duplicate the outline for class use following his talk. He plans his anecdotes, verbal illustrations, and multisensory aids in view of the place of the lecture in the process. A few key ideas or issues will comprise most of the information and attitudes he covers. The content may clarify difficult aspects of outside reading, or provide facts and information not readily

available to students, or present desired attitudes, feelings, or ideals for the students' consideration. As the teacher plans, he recalls the backgrounds and abilities of the class members and attempts to refer to their needs in his talk. He plans his time so that his lecture will be complete before the sound of the bell. In other words, a lecture does not originate in a haphazard manner, but, with careful planning, aids students to move forward in problem solving.

As we have indicated, however, many occasions arise for brief, impromptu lectures. Students may ask the teacher to recount historical events or to explain how to make crisp popovers. The teacher plans quickly in his head, aiming always to provide the information or attitude needed to solve the defined problem. The final summary lecture is planned by consulting notes of student conclusions, taken down by a class recorder. Here the teacher offers again individual or group hypotheses, appraisals, and judgments, and he may add his personal views also if he wishes to. Then he may deliver a brief talk about the relationship of previous learning to the next area of study, as was done in the lecture given to the class which moved from the 1929 crash to the New Deal.

Delivering the Lecture. The talented teacher delivers his lecture in a pleasant, friendly voice. He does not preach, but speaks to his class naturally, in response to their need for his help and guidance. Early in the lecture he raises key issues or expresses ideas which relate to students' needs. As he lectures he does not attempt to solve a problem but stresses attitudes and information which the class may use to solve their own problems. He watches class members for clues to his effectiveness; he senses incipient boredom when a pupil looks out of the window or "doodles" on paper. He generally pauses for class reaction or participation. Although he does not read his lecture, as some preachers do, he follows carefully his planned outline so that he may achieve his purposes. Student questions may distract him from his outline; therefore he evaluates each question for its relevance, and if it seems inappropriate he volunteers to help the individual at some future time. He plans so that he can delete some of his lecture if time runs short.

Pupils flock to hear a certain teacher lecture because of his personality and attitude. The experienced teacher controls nervous mannerisms. As he speaks, he does not button or unbutton his jacket, for

example, but he moves slowly about the room so as to speak more directly to each student. Facial expressions of delight, disgust, anger and fear, change in voice tone and depth, dramatic pauses, increased or decreased volume—all add to the effectiveness of his delivery. He looks at his group as a means of being more personal than if he looked at the ceiling or floor, or out of the window. The teacher as a lecturer is an actor on the educational stage.

The Pupil and the Lecture. What a person is told usually has an effect on him only when it relates to something he wants or to something he has to do. The pupil must need the lecture he is to hear. Students should know when and why they will hear a lecture, and how it fits into problem solving. They should learn whether the purpose of the lecture is to kindle interest, or to present information and attitudes which will be useful during research, or whether it may be used, after they have made hypotheses and judgments, as a summary to supplement their own.

Emphasis upon the necessity for listening, one of the aids to clear thinking, means usually instruction in taking notes. Enlightenment on the structure of a lecture, on its major topics and subtopics, should help; students will learn to take down key points instead of writing during every moment of the lecture. They must see the value of note taking as a means for recording definite information to use when they move into research activities. They need to practice summarizing a lecture paragraph in a single sentence.

Evaluation of the Lecture

Vital in the determination of the teacher's effectiveness as a lecturer is student evaluation of his success. Many teachers have lectured for many hours without any real understanding of how much learning took place as a result.

The evaluation of a lecture should rest in the hands of the students. They will evaluate less by talking about the lecture than by proving that they can use, in their problem solving, the ideas, facts, and skills presented by the lecturer. If they utilize the information and attitudes to solve their problem or to define it, the lecture has been of value. If the class feels that the lecture was interesting and informative but of little personal help in their problem, the teacher may need to question

its relation to the problem-solving process. Thus ordinary methods of evaluation may be ineffective. For example, paper-and-pencil tests are poor tools to evaluate lectures, since they measure ability to recall rather than ability to apply the content to a phase of the learning process.

Teachers are not all equally capable of delivering a lecture. Mills and Douglass go so far as to say that, "It is unquestionably true that high school teachers, especially beginning teachers, are not good lecturers."⁷ Perhaps their fault lies in the fact that they lecture without the purpose of relating what they are saying to the problem in the minds of the pupil or of starting anxiety about a new area of study. Their lecture is not pupil-oriented. Evaluation should help the teacher to meet this limitation. The same is true for a further limitation mentioned by Stiles and Dorsey. They write that "more mature pupils profit most from the lecture method," and that "students who have a highly developed verbal ability are most likely to respond to this approach."⁸ Therefore the talented teacher must plan his lecture carefully for the age level in terms of vocabulary and content. The lecture at the junior high school level, for example, should be concrete in its applications to the pupil's problems, and should run no longer than fifteen minutes. Careful evaluation, made possible by asking students to list ideas gained from the lecture, will help the teacher at a later time to deliver a lecture which is appropriate for a particular group of learners.

Two Lectures

Mrs. B understands the reasons for using a lecture technic. Her class has studied for a week a unit that covers the Civil War period of 1860 to 1864. The class has raised many problems for study during this unit, and for some of the problems they have already found hypotheses. They are now studying Lincoln and his decisions. They know, because of a number of references she has made, that Mrs. B has been active in a local Lincoln study group. The class has asked her to tell them what she has discovered about Lincoln's decisions.

⁷ Hubert H. Mills and Harl R. Douglass, *Teaching in High School*, The Ronald Press Company, New York, 1957, p. 211.

⁸ Lindley J. Stiles and Mattie F. Dorsey, *Democratic Teaching in Secondary Schools*, J. B. Lippincott Company, Philadelphia, 1950, p. 81.

She agrees and goes home to prepare her lecture. She thinks of the forty-five-minute period that limits her talk, and of the impossibility of covering the subject in such a short period, and decides to talk on just one of Lincoln's decisions. She plans her outline carefully to include all important points. She searches her personal collections for pictures and books that she may use to illustrate her talk.

As the class bell rings, Mrs. B offers the class a brief summary of her lecture and mentions its relationship to the problems the class has been discussing. She suggests that they take notes relating to their problem on Lincoln's decisions. She singles out several individuals in the class and says, "John, what I'm going to say today will help you and Dick on the problem you have been working on about whether Lincoln asked advice before making decisions. It will not give you all your answers, but it will help you over several of your difficulties." She does this for other members of her class. Then she gives the pupils permission to ask questions as they arise. She delivers her lecture, keeping careful watch for pupil boredom, always tying what she is saying to the concerns of the individuals in the class, watching her vocabulary and remembering not to talk over the heads of her pupils. She illustrates with pictures and maps and suggests some books that she says give an excellent account of Lincoln's decisions. She is reasonably conscious of her delivery and attempts to be as dramatic as is consistent with her personality. Five minutes before the end of the class period she concludes her talk and asks the class for questions. As the bell rings, several pupils go to her desk to borrow her illustrative material. The following day Mrs. B refers to her lecture and helps the class to review their notes before they continue with step 3 in small groups. She questions individuals to discover how the content of her lecture has helped them. This is her means of evaluating.

Mr. C delivered a lecture on the same topic. He felt he knew enough to talk extemporaneously and therefore engaged in no research for the lecture. The next day he called the class to attention and began talking about Lincoln. He explained only, "Today I'm going to tell you about the decisions made by Lincoln." Several students felt mildly interested, but some started to doodle, talk, or daydream. Mr. C, though he was aware of waning interest, continued. He made no attempt to perfect his delivery. "If the class fails to listen," he reasoned, "that is their business." At the bell, he said, "Now you all have an understanding

about the major decisions made by Lincoln. Read pages 289 to 298 in your book, and I'll give you a test on this material on Friday."

Few comparisons need be made. One teacher is teaching; the other is telling. Mrs. B understands youth and how youth learns, and she knows her function as a teacher for critical thinking.

Let us return to Mrs. B's class for a moment and suppose that the group is one of the slowest in the school, contains many students from the lower socioeconomic group, including some who have been picked up by the police. The class must take United States history as a state requirement for all students. The teacher's lecture to this group will be much shorter, for she realizes the shorter attention span of the slow student. She asks herself, "How can Lincoln's decisions relate to the needs and developmental problems of these youngsters?" She begins with his decision to publish the Emancipation Proclamation, relating it to their need for belonging, in a social area which often causes them to go against the law.

Mrs. B says, "Lincoln turned against what many people thought was right when he freed the slaves. Now when someone says to you that hanging around the streets late at night, or even doing something just a little beyond the law, is against what most people believe, what do you say? You say the same thing Lincoln said—'I don't care what other people think is right.' You and Lincoln are quite a bit alike, then, when you make a decision like that. But I think his decision was different from yours in some ways." And here she develops the point that Lincoln was almost alone in believing firmly that what he was doing was right, and that his position was therefore quite different from that of a boy who is swayed by his companions to do something he doesn't believe in. "He didn't go along with someone else's ideas the way you do, even when you aren't sure, yourself, that you want to."

Mrs. B adapts her lecture to her group, but again she realizes that some individuals will not profit from it. These students she helps to learn to listen if she can, and she also provides them with other learning technics.

Other Views

We include again further words by other writers which have been adapted from articles on the lecture. Although many emphasize the

unpopularity of the lecture, we include these words as an aid to thinking.

Lecture and General Education. The writer taught a physical science course at Pennsylvania College for Women by lecture-demonstration and by groups to achieve two objectives of general education—(1) recall and recognition of facts, principles, and symbols, and (2) understanding of the implications of facts and principles, of pertinent reading material, and of problem situations. The results were as follows: Groups should be employed when the teacher desires to produce greater expression of individual differences on more understanding type of learning (No. 2 above) with the more capable students. Lecture-demonstrations should be employed when the teacher desires to produce greater expression of individual differences on more understanding type of learning (No. 2 above) among least capable students. Lecture-demonstrations should be employed when it is desirable to produce greater expression of individual differences in the recall-recognition type of learning (No. 1 above) among less capable students, both approaches being of equal value for achieving such objectives among the most capable.⁹

Lecture and Social Studies. Experimental comparisons of the lecture and group discussions have shown that, although they produce equal results in the amount of information acquired by students, knowledge gained in discussion is better retained. Group discussion has been found to be distinctly superior to the lecture in stimulating critical thinking and in the development of problem-solving skill. Both approaches can change attitudes; however, research indicates that group discussion is significantly more effective for this purpose. Research findings afford little basis for the wholesale disapproval of the lecture. It is of some value in obtaining all major objectives of social studies instruction.¹⁰

Lecture and Attitudes. A class of twenty-six students in general psychology, taught with a student-centered approach to instruction, was matched with twenty-six students from a similar class taught by the

⁹ John N. Ward, "Group-Study versus Lecture-Demonstration Method in Physical Science Instruction for General Education College Students," *Journal of Experimental Education*, vol. 24, pp. 197-210, March 1956.

¹⁰ Thomas F. Stovall, "Lecture vs. Discussion," *Social Science*, vol. 20, pp. 10-12, January, 1950.

lecture-discussion method. It was concluded that the students learned an equal amount of textbook material from the two methods, but that the attitudes of the student-centered class toward psychology were significantly more positive than were those of the lecture-discussion class. The opinions of the students in the student-centered class revealed that they believed the course was of personal value, but the students in the lecture-discussion class did not concur in this opinion.¹¹

* * *

The lecture technic, when used as a means to fulfill one of the steps of critical thinking, is not a teacher-centered approach with a passive audience. Lecturing, like other technics, is one way to accomplish some steps of thinking and may at times be more efficient and effective than the discussion or group approach. It is not a teacher-centered technic because the teacher knows the place of the material he talks about and the needs of his class in relation to it. His audience is not a passive group of note takers. They know their part in the process and may have requested a lecture to help with a particular difficulty. The students do not all perceive the same ideas, but many, as they define their own needs to solve problems, will gain valuable information and attitudes which will help them to proceed to the next phase of the problem they are studying.

The reader may express his opposition to the lecture, and, like many new teachers, slip into its use as the best way "to get things done." One school administrator moved a tape recorder into his teachers' classrooms to show them how much time they spent in brief talking to the students. Many of them were amazed at the results. We should agree with anyone who may claim that too much use of lecture technic means lessening of efficiency. When the teacher feels the urge to *tell*, he should stop to ask himself, "Is this the best way to take this step in problem solving?" When the answer is yes, then he should lecture, providing only that he does not lecture as many as four or five times in a period.

Like other technics, the lecture is vitally important in one place—at the conclusions of steps 4 and 5 and in forming judgments, when the class needs a final summary and also a glimpse of a new area of study.

¹¹ Robert E. Bills, "An Investigation of Student-centered Teaching," *Journal of Educational Research*, vol. 46, pp. 313-317, December, 1952.

If the reader's conclusions differ, let him determine not to use the lecture if he believes he should not. On the other hand, let him plant a real or imaginary tape in his classroom to ascertain how much time he actually spends in "telling."

LEARNING MATERIALS

*Suggestions for Further Reading**

1. Gilman, Wilbur E., and others: *The Fundamentals of Speaking*, The Macmillan Company, New York, 1951.
2. Hoffman, William G.: *Public Speaking for Businessmen*, McGraw-Hill Book Company, Inc., New York, 1949.

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The following is a list of articles in periodicals, by subject areas. In parentheses the most emphasized technic is offered also.

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- Goodfarb, Barbara: "Experimenting with Paint and Ink," *School Arts*, vol. 56, pp. 19-20, January, 1957. (Laboratory)
- Kriesberg, Irving: "Art Education for Today," *Education*, vol. 77, pp. 140-144, November, 1956. (Laboratory)

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- Breault, C. W.: "Three Steps to Short Stories," *The English Journal*, vol. 45, pp. 141-144, March, 1956. (Communications)
- Dittmer, Jane E.: "Paragraph Writing Can Be Fun," *The English Journal*, vol. 42, pp. 460-462, November, 1953. (Communications)
- Flenniken, Clarissa: "A Classroom Use of a Film," *The English Journal*, vol. 42, pp. 446-448, November, 1953. (Audio-visual)
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- Powell, Eugene: "Oral English with a Purpose," *The English Journal*, vol. 45, pp. 416-417, October, 1956. (Discussion)
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* See also the summaries under *Other Views* in this chapter. See also the other list following this chapter.

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- Thralls, Zoe A.: "The Globe Is an Essential Geographic Tool," *NEA Journal*, vol. 46, pp. 30-31, January, 1957. (Audio-visual)

LANGUAGE

- Hoey, Allan S.: "Visual Aids for the Teaching of Classics," *The Classical Journal*, vol. 51, pp. 235-240, February, 1956. (Audio-visual)
- Huzar, Eleanor G.: "Structural Linguistics and Latin Teaching," *The Classical Journal*, vol. 52, pp. 268-274, March, 1957. (Laboratory)
- McIntyre, Mary E.: "Current Materials and Events in Foreign Language Teaching," *California Journal of Education*, vol. 31, pp. 409-414, November, 1956. (Audio-visual)
- Mayer, Edgar: "An Ear for Languages," *The Modern Languages Journal*, vol. 41, pp. 39-40, January, 1957. (Lecture)
- Randall, Earle S.: "The Language Laboratory: A New Tool," *The Educational Forum*, vol. 20, pp. 323-328, March, 1956. (Laboratory)

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- Buzzetti, Beatrice: "An Experiment in Teaching," *The Mathematics Teacher*, vol. 48, pp. 360-365, May, 1955. (Small Group)
- Lawry, William C.: "Pupil Discovery in Junior High School Mathematics," *The Mathematics Teacher*, vol. 49, pp. 301-303, April, 1956. (Laboratory)
- Schweihardt, Edward: "The Stock Market Enters the Classroom," *Social Education*, vol. 20, pp. 373-374, December, 1956. (Laboratory)

SCIENCE

- Alyea, Hubert N.: "Tested Demonstrations in General Chemistry," *Journal of Chemical Education*, vol. 32, pp. 11A-14A, 28-29, January, 1955. (Lecture)
- Brenneman, Doris M.: "Biology for Interest and Social Usefulness," *California Journal of Secondary Education*, vol. 32, pp. 78-82, February, 1957. (Audio-visual)
- Hered, William: "Chemistry Teaching for General Education," *Journal of Chemical Education*, vol. 30, pp. 626-627, December, 1953. (Discussion)
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PART FOUR



12

Planning

A panicky new teacher may quail before his class when he realizes that with ten minutes of the period left, he has completed his plan. In contrast, the experienced teacher often sighs, "I never have enough time in class to finish what I plan." The difference may lie, not in more ambitious planning by the experienced teacher, but in greater sensitivity to student desires and in less rigid adherence to preconceived ideas.

Our educational forebears were not unaware of planning. Comenius wrote, "The subjects of instruction are to be so divided that each year, months, week, day, and even each hour may have a definite task appointed for it." Although his philosophy leaves much to be desired, Comenius did not underestimate the need for planning. Today it is as indispensable as when Comenius wrote, but the way to plan has altered. Rigid lesson plans are as suspect as a blank page with no plan. One

of the greatest deficiencies of beginning teachers is their neglect of adequate, creative, extensive, thoughtful plans.

Problems in Planning

Planning is an activity of everyday life for most adults. The administrator or executive, the department or division superintendent, the floor boss, and the worker on the line, all find that planning is the only way to achieve production goals. The housewife plans her daily routine so that her many tasks and chores may be accomplished. It is little wonder that beginning teachers feel concerned about this preliminary task in the teaching process. The typical beginning teacher wonders who prepares course outlines, how much freedom he will have to plan units, and how much planning will be needed for each day's work. Recently a student teacher told us, "I must be overplanning." She taught only one class a day but spent an average of three hours each night in planning. She realized that such meticulous effort could not continue, especially since she will teach perhaps five classes a day on her first paid job. It is the purpose of this chapter to present the problems involved in planning for teaching, and in particular to offer some ideas and suggestions for planning in the problem-solving process.

Books and articles which discuss planning direct the reader's attention to three basic types of plans, designed, severally, for the course of study, the unit, and the daily lesson. For the lesson many published outlines are available to teachers. The three ways of planning need careful consideration, especially since there is so much vague thinking about the true purpose of each. A school administrator stated recently that new teachers today "don't even know how to make a lesson plan." We wonder what he means. If he means that they cannot fill a book with unusable words—"methods, goals, and materials"—we must ask, "Why bother?" If he implies that teachers cannot make workable plans in any form, then he is indicating a serious weakness of their training institutions.

Planning is not something the teacher completes before he teaches a class. It is not writing neat-looking units and daily-lesson plans and then teaching from the book. In a sense, this is what planning has often been. Actually, planning is a continuous process which occurs

before, during, and after learning, and which involves the students as well as the teacher.

Planning and Critical Thinking

During problem solving definite planning occurs at steps 1, 2, and 5; and some kinds of planning may take place at steps 3 and 4 and in forming judgments. The teacher preplans his work so that he can help his students to feel anxiety. He must study subject matter to refresh his own understanding of content. He then thinks about ways to arouse interest.

A new student teacher was instructed by her critic teacher to cover the United States Constitution during the next two weeks. The student began by requiring the class to memorize the Preamble and to read the Constitution. The typical question-and-answer period followed each day, until the student teacher realized that the class was learning very little. Time had not been spent in stimulating anxiety, and the students felt no personal interest in the unit. At the conclusion of the first week, results of a test were disappointing. The following week, after reevaluating her own work, the new teacher attempted a new approach. On Monday morning, after a weekend of study and thought, she began her class by saying, "Can a woman ever become President of the United States, and do you think one ever will?" The class awoke. The students agreed that a woman could be elected legally; they had read the parts in the Constitution pertaining to women's rights. Then the class formulated the problem, "What will stand in the way of a woman becoming President?" On the blackboard they listed possible objections, such as tradition, doubt about the physical and mental strength of women, women's attitude toward electing one of their own sex, and men's usually hostile point of view. The student teacher commented at the close of the study, "Those youngsters learned more facts and ideas than I had dreamed possible, and I didn't have to pull out one thing from them." In this illustration the teacher's preplanning consisted in studying her subject and establishing hypotheses and judgments of her own, and then in formulating a good question which she thought would help students to find interest in the topic. "A teacher plans beforehand not in order to direct the unit along predetermined lines but, rather, to gain a preliminary view of the full possibilities

of the unit and become a more intelligent guide.”¹ The teacher also prepared questions dealing with segregation, federal aid to education and its constitutional justification (if any), the popular fifth amendment, and others which she expected would make students wonder about the Constitution and its significance to each one of them. They were stimulated to study the document, and moved naturally to a detailed consideration of its content and implications.

After young people have discovered that the problem is of interest to them they begin to plan how to study it. Only the student can define his specific problem as it falls in one of the problem areas of his life, but it is the teacher's job to help him to discover what his problem is. The teacher and students plan mutually, then, concerning the approaches to the solution. Miss E, a teacher in a problems-of-democracy class, was faced with exploring the problem, “Should you rent or own a home?” Her planning for the anxiety stage of learning had led her to raise many issues concerning saving money by buying or renting; she had proposed questions about interest rates, taxes, and upkeep. The class reacted positively to these issues and discussion waxed hot. Miss E encouraged participation at this stage by asking the class members to tell why they thought the problem of buying a home was of personal interest to them now, what ideas they held on this issue at present as a result of their personal experience, and how they thought the study might affect their own lives or opinions or purposes.

The teacher led them, then, to define the problem and the subproblems which were of present and future concern to each one of them. Several students had heard their parents discuss buying a home; as a result of these overheard and misunderstood conversations, many had erroneous information. Miss E suggested that those who were interested might pursue their problem by reading or by talking with bankers, builders, and real-estate brokers. She helped the group to plan their approach to their problem. She helped them to form groups, each concerned with a different subproblem—financing a home, buying a mass-produced, prefabricated home versus buying a custom-made home, cost of maintaining a rented versus an owned home—all relating and contributing to an understanding of the basic problem which they had defined, “Should you rent or own a home?” Miss E helped the

¹ Freeman Glenn Macomber, *Teaching in the Modern Secondary School*, McGraw-Hill Book Company, Inc., 1952, New York, p. 109.

group also to work toward a solution of their problems by suggesting how to get in touch with people who might contribute factual information, where to find discussions about taxes and interest rates, how to find necessary records for estimating the value of homes.

During research the student follows out his plans set at step 2. There is usually little planning by either student or teacher; this is a work stage. However, if the student fails to move forward, the teacher takes him back to redefine the problem or to plan a different means of attack. Sometimes, with problems which are too broad or which need preliminary work before they can be solved, the teacher suggests that the group drop the problem temporarily at step 3 and return to it later when they have gained the necessary background. Occasions will arise also, at step 3, when teacher and students will plan to have the teacher give a lecture or conduct a demonstration.

In defining the problem, the student and teacher plan the presentation of hypotheses to the class at step 4. In the problems-of-democracy class, the group concerned with the cost of borrowing money visited a local bank and there obtained enough copies of interest tables for the entire class. They gave out the tables, and in their group presentation, illustrated costs for borrowing various sums of money. When the class learned that they would pay almost \$120 per month for twenty-five years on a \$20,000 mortgage, and that during the first year, about \$80 of this \$120 would go to pay interest alone, they had specific information upon which to draw hypotheses and form judgments. In like manner the teacher helped the other groups to plan their research and presentations.

Finally at step 5 the teacher and pupils must pull together all findings and consider application to other problems, past and future. A teacher may plan a brief concluding lecture, bringing together all of the major issues and their application to the students' future studies and life. He may plan also an evaluative discussion or ask for a written evaluation as a test or paper. The teacher will often plan with students the approach to step 5.

In the buying-versus-renting problem, Miss E led the class in a discussion of the application of their hypotheses to future learning. Then she planned a brief summarizing lecture of hypotheses and appraisals.

"Many of you agreed," she said, "that owning a home makes people

assume a lot of financial responsibility for a long period of time. You felt that in the future you would have to investigate further to find out whether such a responsibility makes owning property worth while." She continued with the summary and then said, "Now what personal judgments or decisions have some of you made?"

A discussion followed, which the teacher occasionally sharpened by specific questions.

"Lois, if I remember correctly, you were very much against ever owning a home when we started this topic a week ago. Have you changed your mind?"

"Yes and no. I still feel my parents are right in renting, because my father just doesn't have time to do all the chores required when you own a home. On the other hand, when I see what my father pays each month with nothing but a month's living to show for it, I have come to feel that perhaps owning your own home is a good way to save money. If I should marry a person who would be likely to have more time than my father does, I think I should want to own a home."

Miss E asked several others in the class similar questions, all the time attempting to discover how their personal values had changed as a result of critical thinking. She was concerned also about goals and aims as she asked Billy, "Do you feel you gained the knowledge you wanted about property tax rates? Have you learned that the outlay for taxes must be added to the cost of your monthly mortgage payments, and that the tax rates may change between now and the time you may wish to buy a home?"

Billy then said that he had learned a good deal and thought he had a better understanding of the subject, but he wanted to continue the study. He said he had decided he ought to investigate just how much money is actually paid out in a time payment on any loan, not just on a loan on a home.

Then Miss E said, "Here is an essay question which should help you to be sure you have formed your own judgments. Please take about ten or fifteen minutes to write on it." She wrote on the blackboard, "If you were about to be married, would you prefer to rent or own a home, and why? Do you feel you would give the same answer to this question if you were an older married couple with three children, and why?" Finally, she led the class to relate their conclusions to past study of figuring interest in mathematics and of solving the problem, "In what

ways do banks help citizens?" in the problems-of-democracy class. Then she asked, "How will this study relate to our next consideration—improving the community?" She had planned a brief summary lecture with a few hints about the new topic, after which she invited discussion.

Thus planning continues throughout most of the process; even at step 3 or step 4 during presentation of findings, the student may need to redefine his problem or procedure or to postpone making hypotheses. All of these reconsiderations are forms of planning. The teacher plans; the student plans; they plan together. Their planning is continuous, day by day, problem to problem, throughout the year.

The teacher will often plan to blend the last steps of problem solving with the forming of judgments. He may ask for hypotheses, appraisals, and judgments in oral and/or written form, and he may deliver a brief lecture as a final summary and step into the next problem area or topic. In the same way he may plan to blend steps 1 and 2 by the use of a single discussion which would serve to arouse anxiety and to define problems and approach. By planning to vary his attack thus, the teacher helps to keep critical thinking in the classroom from becoming a mechanical process, which is so much the same from problem to problem that the students can predict exactly what will occur at every moment.

But what happens to the teacher's plans if the members of the class fail to act as expected? In arousing interest Miss E tried to consider not only the general level of her group, but also Jody, Frankie, Jeff, and Fred, who had special problems ranging from lack of ability and achievement to too much pressure at home. She directed some of her comments to them. She also considered socioeconomic groups. In this class students were mostly from the middle group, but she directed some comments to Aura and Karyl from the upper strata, and to Bert and Liz from the lower. All of this she had planned ahead.

When the general and specific problems were listed, with proposed approaches, Miss B attempted to single out the students who had not felt anxiety (after the group as a whole, through their ability to go ahead and plan, had showed their interest). She asked Larry and Paul and Liz to talk with her when the others began their preparations for their research. She singled them out at this point because while everyone was busy and moving about these youngsters would not attract much attention. She told the unenthusiastic little group

that she had noticed they did not seem interested. Larry and Paul said that they never intended to get married and so had no need for ideas about buying a house. Miss E accepted their feelings and then mentioned a group of working men she knew who were living together in a home they purchased because it seemed the cheapest way to live. Here she aroused their interest. Liz said that she would never have money to buy a house anyway. Again Miss E accepted this statement; afterward, she asked Liz what she would do if she married someone with a good job who wanted to buy a house. Again she started anxiety. There will always be occasions when, no matter what the teacher says, no interest will be apparent. At these barren times all that can be expected of the teacher is that he will keep trying.

Miss E has preplanned by taking into consideration both her group and the individuals in it. But as she planned cooperatively with students in defining problems, she watched for lack of interest and failure. Here she continued to plan cooperatively by attempting to help these special students still further. For the research, she had preplanned materials which would be appropriate to the abilities and interests of the individuals in the class. If the individuals fail to carry through their research, she will single them out, either individually or in a small group, and attempt to reflect their feelings. This part she obviously cannot preplan. The same is true for the last steps. When students fail to name hypotheses, appraisals, and judgments, she must help them to do so if possible.

If the group as a whole fails to respond at any of the steps of critical thinking, the teacher must reflect the general feeling of the group and attempt to determine where planning went awry. Such comments as, "I don't know what we're supposed to be doing," and, "I'm all mixed up about whether we're talking about houses or taxes," indicate the need to return to a previous step and start over. The statements should be a warning signal to the teacher that he was not completely effective, either in his planning ahead (perhaps he failed to think carefully about needs and developmental problems) or in his cooperative planning (perhaps he did not really allow the group to discover their own felt problems). However, when the students are unused to problem solving, it may be only their lack of experience which makes them balk at a difficult hurdle. The teacher must expect such setbacks and must cheerfully try again.

Preplanning

Planning for critical thinking is divided into three parts; one is preplanning—what the teacher does before meeting his class; the second is planning cooperatively; and the third is daily planning as a result of cooperative planning. Before moving ahead to these areas let us look at traditional planning, and at predetermined limits, as background material for preplanning.

Traditional Planning. Traditionally, planning was effected by means of detailed outlines for courses, units, and days. These outlines included objectives, assignments, pivotal questions, and methods and materials. The subdivisions are confusing since some of the content of a course of study may be determined, at least in part, by the state or other outside agencies, and since the words themselves are too general.

Taking the traditional outline headings seriatim, we find that *objectives* are of little help. The talented teacher aims to promote critical thinking. If he keeps this objective in mind, he approaches success. If he lists ten objectives, the probabilities are that he will look with surprise at a supervisor who asks, "Are you working constantly to promote all those objectives?" The teacher knows that he cannot hold them in mind at once. Besides, he does not plan objectives since he knows that hypotheses and judgments will differ among the students. Of course, in preplanning he should think carefully about what he hopes his students may learn; he hopes, for example, that they will appreciate the place of science in everyday life. In his teaching he may stress this hope, but he cannot rightfully claim that it is an objective.

In like manner, turning to the area of *methods and materials*, although the teacher may use other methods, such as drill, when he thinks them necessary, in this study we are concerned only with problem solving. That is his method. He may list possible technics (multi-sensory in arousing anxiety, small groups in defining problems), but from that point on the technics must evolve in mutual planning. He may, however, make a detailed list of materials needed for getting attention and interest, and of possible materials for research. Also, *pivotal questions* and all other ways of stirring up anxiety should be listed carefully and in detail. *Assignments* he will not list because he must wait until problems have been defined. Homework should evolve naturally from problems which need solutions. Thus the teacher who is

using the problem-solving method will discard traditional-planning titles though he will retain their spirit.

Predetermined Limits to Teacher Planning. The curriculum may be partly determined by others before the teacher begins his own planning. It is not our purpose to discuss the pros and cons of such a situation, but merely to explain the kinds of limits within which a teacher may need to plan.

Some states provide curriculum and course guides for teachers in all subjects taught at the secondary level. These guides vary from brief course outlines to detailed resource units for each specific aspect of a course. The teacher will learn from his department head the availability of such material and whether it is in the form of suggestion or directive. Except for state directives, the local elected or appointed school board or committee is actually responsible for the program of instruction in its school. This function is usually delegated to the chief school officer, the superintendent of schools, and his staff. The administrator of each school, often with department chairmen, representatives from the teaching staff, and parents, plans the courses to be offered each year. Occasionally towns and cities invite pupil participation in curriculum planning.

After a program of studies has been approved by the chief school officer and his aides, the teachers in each department gather to plan the content for each level. The classroom teacher will teach a course which expects certain information and mental development of the student when he enters in September and when he leaves in June. The teacher, then, plans within the limits set by himself and his colleagues at the departmental level, as well as by the administration, school board, and state. These predetermined limits and the individual teacher's freedom have been summarized by Burton. "The teacher will have large choice, even freedom, within the local framework in the best school systems. Teacher freedom and responsibility will depend upon the vision of superintendents and principals in those formal systems which are beginning to move toward modern curriculums and methods. The teacher will have very little, often no, choice at all in the truly formal and traditional systems."²

Course Planning. It used to be believed that many courses set limits

² William H. Burton, *The Guidance of Learning Activities*, 2d ed., Appleton-Century-Crofts, Inc., New York, 1952, p. 414.

over and above predetermined limits because of their nature and the generally accepted sequence of the content as published in textbooks. However, as has been demonstrated in the study of physics by the Physical Science Study Committee³ begun at the Massachusetts Institute of Technology, such preconceived limits are often unrelated to modern concepts and to the whole matter of arousing student anxieties. In no course should the teacher be a slave to sequence of content, but should question every unit in his course outline.

Assuming that a teacher will gain more freedom in selecting content and method in the future, how, then, does he engage in course planning? Preplanning a course involves a study by the teacher of his subject, then a listing, in outline form, of the content which he feels should be covered in one year. If requirements are handed down to him, the teacher must use these in addition to his own ideas. He must also pay heed to prerequisite courses and to those for which his course prepares. If the teacher admires a certain text, he may desire to utilize the table of contents as his basic outline of units. He may adapt topics from the table of contents but rearrange them to suit his purposes. The outline may be in the form of experiences which he wants for his class, such as conservation of local natural resources, dating, and selection of a vocation. Such an outline would be popular in many of the so-called nonacademic subjects.

In addition to the outline, in course planning the teacher will set tentative time limits for major areas or units, in terms of days or weeks. The course outline might be duplicated then and distributed to each student for his personal guidance during the year. Later the class could be allowed to add or delete items, if it seemed desirable, during the progress from one problem to another. It is, of course, perfectly possible to allow the students to establish their own units, but usually such a procedure will be deemed impractical.

A teacher of a course of science designed for high school students who complete their education with their high school graduation was told only that he was expected to present an over-all view of science to his students. His course was unrelated directly to other science courses or to other studies in the curriculum. He decided to use a book called *New Senior Science*, published by the American Book Company. He

³ For publications of this committee, see Science Study Series, Wesleyan University Press, Inc., Columbus 16, Ohio.

talked with the other science teachers in the school to gather their ideas about possible content for his course of study; then he sat down and made a list of his own ideas on the same subject. The composite result was checked against the table of contents of his chosen book and also against the material of other similar books. With all of these resources, he evolved a course plan of units composed of the topics he would consider during the year and the tentative amounts of time to be spent on each. His course of study read as follows: "How science changes lives. The universe as science sees it. The earth. The resources of the universe. The resources of the earth. Energy as one of the resources. Weather. Man in the universe. Health and safety." Each of these areas is very broad. The teacher might feel that he must further circumscribe some of them by setting up subdivisions for the units. If it is possible, however, he should go about stimulating anxiety within the broad areas, allowing the students to name their personal problems within the unit divisions.

Unit Planning. Part of preplanning, then, concerns preparation for the total course. At this point the teacher must select those parts which he wishes to teach by some other method than problem solving. Ordinarily he does not further subdivide the units, but turns to other tasks in preplanning them. A complete preplan for each unit would include at least most of the following: time to be spent on the unit; sources for study by the teacher in his own preparation; hopes for what the student might learn; teaching materials for arousing interest plus possible materials and sources for research; technics to be used at steps 1 and 2; a long and careful list of questions or ideas to stimulate anxieties.

Miss N taught twelfth-grade history of the United States, required by state law. The directives she had received instructed her to cover the history of our country from its discovery in 1492 to the present. She had outlined her course as did the teacher of senior science. In this instance the choice of book had already been determined. The class would use Canfield and Wilder's *The Making of Modern America*.

Miss N began with course planning, giving the name of the course and listing the units to be covered. Like the science teacher, she established the units by consulting many sources. She decided that she would start with the present day position of the United States and work back in history to cover preceding periods such as the second World War, the depression years of 1929-1939, the first World War and the

ten years following, and back finally to Columbus. In all units she would stress the contributions of people, and all of the study would show the relationship to the present. Thus she titled her first unit: "The United States in the world today and the men who contribute to its position of leadership." As for time scheduling, Miss N weighed her units and then assigned times. She planned three weeks for the unit on the United States today.

In actual planning for this and other units, Miss N listed sources for her own study. In this preparation for her teaching she reviewed subject matter in order to help her students through all the steps of critical thinking. On this first unit, she listed some of the following: "New news magazines such as *Time* and *Newsweek*. My history books from college. Editorials in leading newspapers about the position of the United States—Go to the library and read *The New York Times* and *The Christian Science Monitor*. Toynbee and his predictions. Current writings of Morison, Commager, Nevins, Beard." Miss N planned one unit at a time, but planned well in advance to allow for serious study and thought.

Beside the first unit, Miss N noted her hopes for the students. "I hope the students may become aware of just what position the United States holds in today's world and of possible things they may have an opportunity to do to improve that position. I shall emphasize this aspect of the study."

Next came her list of materials for arousing anxiety and for possible use at step 3. This list contained all those pamphlets and multi-sensory aids which she had been collecting over a period of years ranging from a newspaper clipping about the first Russian satellite to a booklet on capitalism from the Tufts University Civic Education Center. She also checked her audio-visual catalogues and scheduled a movie as a way of increasing interest. Then she listed resources in the classroom and the school library for use in research and made a note to check the community library for other source material.

For technics to be used at steps 1 and 2, she listed the multisensory technics and also small-group discussions on the question, "Are you worried about the position of the United States in today's world and why?" She also included class discussion which would pay some attention to student feelings about the value of the material in the unit for their own lives. Here she noted the needs of security and belonging in

the social and economic areas. At step 2 she listed general discussion coupled with individual writing of problems and plans. She planned thus to use the communications technic, which would lead the students to research on their defined problems at step 3.

Her final planning list for the first unit was her careful group of questions and thoughts for arousing anxiety. For general discussion, she listed fifteen questions, and beside each the needs of the students and the developmental areas which it emphasized. Two of these were: "What do ordinary citizens have to do with the position of the United States?" (The need for security, safety in social, civic areas.) "How might you, if you visited a foreign country, help the position of the United States?" (The need for security, safety, success in economic, civic, social areas.) The teacher asked these questions to help each student to think about his present convictions, to realize how these convictions may change through learning, and to consider what he feels is the value of the problem in relation to his ambitions for the future.

At this point she paused to consider the individuals in her class. As a whole the group was intelligent and eager. However, since she realized that Olive and Pat were a little slow, she phrased a question especially for them: "How does the position of our country affect your own family?" Then she thought of Joey from a low socioeconomic group, who was not really interested in generalizations about the United States in the world, and she phrased a new question: "What if we don't bother to be interested in the position of the United States?" Finally there was Denyse, who had been in the country only a year; for her she wrote down: "Does the position of the United States affect other countries and their people?"

We can see that adequate preplanning of a unit involves much time and many kinds of activities. Miss N is now ready to enter the classroom and undertake her teaching. "Lesson planning is nothing more or less than figuring out one's plans for doing his job as a teacher."⁴

Planning Cooperatively

Much of the planning of the talented teacher evolves from the work of the class. A detailed plan which rigidly outlines objectives, materials,

⁴ Kenneth H. Hansen, *High School Teaching*, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1957, p. 164.

and assignments, stifles all initiative by the class, and therefore in planning for problem solving and judgment the teacher often works as a member of the group. Course planning he usually does alone; units and daily lessons are, partly at least, planned cooperatively.

The class, arriving in September, receives a course outline plus other introductory materials and equipment, such as books, dissecting sets, workbooks, and notebooks. After the preliminaries of organizing the class are concluded, and they have been told what is expected of them in the way of outside work, class behavior, and evaluation procedures, the class undertakes the first major topic or unit on the course outline. As a preliminary, the teacher may wish to spend a few minutes or perhaps a full period in introducing the course outline. From here the teacher moves into his preplanned ways of arousing anxieties. Then he and the class start to plan the first unit. A day or two may be spent in planning a sequence of subtopics, activities, and materials for the first unit, which might run from one to four or more weeks. This is unit planning in the classroom. The class may agree on a series of ten major problems and then proceed to determine procedures for steps 3 and 4.

Teacher and students work together in each unit to plan subparts of content, technics, and evaluations. Only the original technic (such as use of small groups) has been preplanned by the teacher. Together they follow through step 2 and decide upon problems and way of attack. The students cover steps 3 and 4 as a result of the cooperative planning, which, as we can see, occurs mostly at step 2.

A description of this sort of planning has been presented many times, showing how teacher and students work together to plan what will be studied and how. The teacher is a member of the group; he has no preconceived decision about content or approach. Students and teacher discover their plan in cooperation.

At this stage in planning, the teacher must watch for one important difficulty. After he has helped class members to be aware of their anxieties, he should not expect them then to be aware of all the problems which they might like to solve. Many new areas of interest will be discovered during research and even in forming hypotheses, and only then will students be ready to define a problem or to redefine one already named. Thus at step 2, during cooperative planning, the teacher does not make the mistake of saying to the class, "Let's name all those problems which interest you in this general area or unit, 'How

Science Changes Lives,'” assuming then that a complete list has been given. The students should go ahead and make such a list, but periodically it should be reevaluated, particularly during and after research. Only in this way does the teacher take advantage of the development in learning which is taking place. As the students come to know more about the topic, they come to know more about the problems within the topic which need solving. If they name only one problem at step 2, the teacher goes ahead with it, knowing that further delving will make them aware of further problems.

Resultant Planning

In his teaching the talented teacher is not fooled by the fact that much planning is accomplished cooperatively with students; he does not decide that his job is therefore finished. As a result of class activities he plans every day, and produces a flexible daily lesson plan. Each class should assign one person at least to record activities, so that, armed with these notes, the teacher may engage in daily planning. Students must be encouraged to write down all that takes place, including discussion about planning. Class notes will include problems upon which the teacher may need further personal research, ways of attack which require the gathering of further materials, hypotheses which may indicate need for planning further study or may point the way to the technic which the teacher may need at step 5 and in forming judgments. Notes will show the sequence of events and help teacher and class to decide upon possible ways to evaluate. They may be used also to summarize areas studied as a way to plan review. Thus it is not true that the teacher stops planning at step 2, even though the oft-heard question, “How can I plan until I know what the students want?” is valid for resultant or daily planning.

An English class in the ninth grade undertook to study a unit entitled, “Short Poems.” The class had worked through the anxiety stage and had decided to consider several problems, one at a time. The first one was, “How can we understand and appreciate a short poem?” Some were more detailed, involving questions about rhythm and rhyme; others had to do with the writing of short poems. The class determined to study carefully different short poems, one for each group of students. They would then report back to the class their hypotheses

about the ways they found to understand and appreciate the poem chosen (step 4). Since they evidently needed access to short poems of fairly equivalent length, they asked the teacher to make such poetry available. Having known beforehand that the unit would cover this topic, Mr. G had gathered together a large number of books containing short poems; he had even marked the pages where these poems might be found. At the end of the hour he explained to the class about this available material. They asked him to choose a poem for each group, saying that later on they might wish to make their own choices.

After the class had left, Mr. G read over the notes of the class recorder, realizing that he must arrange poems for six separate groups. Accordingly he eliminated songs such as "The Passionate Shepherd to His Love," and chose instead six sonnets ranging from Shakespeare to Santayana. But in thinking over the ability of some of the class members, he realized they would have a difficult time with these particular sonnets. He therefore chose two poems for each group instead of one, the two being of unequal difficulty. In a general manner he planned an introductory lecture for the next day, explaining why he had chosen sonnets, what the class needed to know about their structure, and how each group might deal with the two sonnets requested. At the same time he planned a brief discussion of how one reads a sonnet. Then he planned to turn to group 1 and say, "Here is a Shakespearean sonnet. Why don't you take this, Johnny and Lee and Patsy? Here is a sonnet by Jean Starr Untemeyer called 'High Tide.' Bob and Frank, why don't you try this one?" He would do the same sort of thing with the other groups.

Again at the end of step 4, after each group had listed ways to understand and appreciate, ranging from reading the poems aloud to analyzing the words closely for their meaning, the teacher engaged in planning. From the class notes he gathered all the hypotheses of the various groups and listed them. Then he prepared a brief lecture to summarize student findings, to suggest several possible omissions, and to point out the kinds of problems their conclusions probably opened to them. For instance, he showed that one way to appreciate a poem is to listen to its rhythm, a thought which they had not emphasized; and he recommended that they think of studying the rhythm of certain poems. "See if you don't enjoy them more," he said. He pointed out also that understanding and appreciating poetry was very much like

understanding and appreciating prose. After his lecture, he planned a period of discussion. Mr. G also planned for a brief report from the students in which they would write on the questions, "In looking at another short poem, how can I apply what I learned in this one?" and, "What do I really believe about short poems?"

It will depend upon the length of the problem whether or not the teacher finds that he has an evening for planning the approaches to step 5 and to forming judgments. When the problem is brief, the teacher may plan instantly the technic which will be most beneficial to students in relating their new learning to old and new problems; he may ask the students to plan with him; or he may plan ahead to combine the last three steps.

Thus planning a class experience is a three-fold affair of preplans, cooperative plans, and resultant plans. The teacher prepares his subject matter by study; he arranges for materials and physical environment; he plans means for stimulating anxieties in each learning area; he plans with pupils how to state their problems and how to attack them; he guides them in research; and finally he plans, as a result of class findings, the last step of critical thinking. It is obvious that careful pre-planning, cooperative planning, and resultant planning, include attention to evaluation and to intensifying student experiences through both motivation and the broad approach.

Planning for Working with Other Teachers

Frequently in working with problem solving in a particular subject, teachers and pupils will wish to include other teachers in their work or research. It is common practice, even in the more traditional school, to plan to involve the school librarian or the art or shop teacher. The librarian provides resource material for research and projects; the art and shop teachers are often asked if their facilities may be used in work on posters, models, charts, and maps. Schools organized around the core provide integration of subject content through school-wide planning. But since many senior high and junior high schools are organized according to traditional subject matter areas, it is essential for teachers to plan to involve other instructors in the school when students need outside help in problem solutions.

Mrs. S's class in English is ready to read historical books. The class

decides to obtain suggestions for books from the history teacher. Mrs. S allows the students to establish their own contact, but she also talks with the history teacher, suggesting that he might wish to use the results of the reading in his classes to verify historical findings.

Cooperation among teachers may encompass more than assistance, at step 2, in the solution of isolated problems. The English and history teachers might preplan a unit on great American writers, one approaching the content from a historical viewpoint and the other considering both content and style of writing from the viewpoint of literary criticism. The pupils would thus share an experience with the two teachers. Such an approach could occur in a very traditional setting if the two teachers were willing to work through cooperative planning. Naturally the students would plan with their separate teachers, and the teachers and pupils would try to avoid duplication of content or assignments. In similar fashion mathematics might relate to shop, graphics, and business courses; biology might relate to physical education and health; chemistry and physics to mathematics. Thus through interclass planning, the teacher points up to students the interrelationships of learning, an area which has too often been neglected.

* * *

That planning is a vital part of good teaching we have attempted to indicate. In advocating an alteration of its character, we have in no way meant to minimize or deemphasize its importance. As we watch novice teachers, we are often saddened by their obviously hasty and thoughtless planning. Preparation for teaching needs careful thinking and well-thought out hypotheses and judgments. We hope that the reader's conclusions will agree with ours, and that they will lead him to extensive, thoughtful, creative preplanning, cooperative planning, and resultant planning.

About two thousand years ago men were repeating a maxim which may still instruct us. "It is a bad plan that admits of no modification." Careful planning plans upon modification. It is careful because it foresees many possibilities. It is creative because it leaves room for creativity in students. With a poorly planned unit a teacher "panics" because his plan runs out. Here is neither care nor creativity. Has he forgotten that his students may have plans? Depth of planning paves the way for the awakening by students to the many possible problems

that face them in any given unit. The talented teacher should, in effect, "keep one day ahead of the students" in daily planning which grows out of daily experience. But in over-all course and unit planning, he should engage in hours of research, thinking, and recollection. So will he make up a plan which will have strength to support him and flexibility to meet the imagination of youth.

LEARNING MATERIALS

Some Cases

1. The teacher said, "I'm careful to plan varied activities—movies, projects, field trips, a dramatization, oral reports. I use them all. I know how to plan." Why is the teacher's statement difficult to fit into the concept of cooperative planning in problem solving and how might he be aided to understand the rigidity, in place of the variety, in his planning?

2. The first teacher said, "I plan extensively. I spent hours deciding on objectives and activities for this unit on French short stories—learning about other cultures through laboratories and those fancy technics. I planned to include important writers like Gautier, Maupassant, Zola."

The second teacher said, "I spent hours finding ways to arouse anxiety and to proceed into defining problems for a unit on French short stories. I'll tell about the writers and some of the stories, show a movie about some of the places, discuss the difference between French and modern American short stories. With all this the students should be able to define problems. From there we'll plan together."

Wherein do you think the second teacher will do a better job of teaching than the first?

3. The first teacher said, "I never plan ahead. If you're going to plan with students, you have to wait till you know what they want."

The second teacher said, "I don't believe in planning with students. How do they know what's important? That's for me to decide. I believe in having it all in mind ahead of time."

How might these teachers be helped to improve their planning?

4. The student said, "In history we studied about what Emerson and Thoreau did. But when we read some of their writing in English, the teacher expected us to remember the history. I don't think this is fair."

What are the implications about present planning of this student's courses, and what might be done to improve it?

5. The teacher told the supervisor, "I know I'm supposed to let the students plan the problems to be studied, but they have never experienced 'Purchasing Medical and Dental Supplies in Consumer Training,' so how do they know what the problems are?"

The supervisor replied, "In your planning you must make the students aware of their problems."

Why did he reply thus, and what are the implications of his statement for planning?

Some Controversial Thoughts

1. "The unit method of teaching is as close to lifelike education as we have yet been able to approach."⁵
2. Teachers tend first to look for texts and references and to plan around these rather than around desired pupil growths and materials necessary for experiences to promote such growth.⁶
3. Planning a course means setting up a list of "traits" (such as observation of social amenities, or emphasis on human relations) and then planning activities that will offer experiences of them.⁷
4. "Critics of pupil planning have pointed out that in most cases a clever teacher has previously done the planning and that the machinery of pupil participation has become a thinly veiled motivation device."⁸
5. "Everyone's natural genius should be carried as far as possible; but to attempt putting another on him will be labor in vain; and what is so plastered on will at best sit as affectation."⁹
6. Pupils are rarely deceived by lack of preparation leading to hasty improvisations in class.¹⁰

Suggestions for Further Reading

1. Burton, William H.: *The Guidance of Learning Activities*, Appleton-Century-Crofts, Inc., New York, 1952. Chapters 12, 13, 14, "The Unit: Planning and Developing Units; The Analysis of an Illustrative Unit."
 2. Giles, H. H.: *Teacher-Pupil Planning*, Harper & Brothers, New York, 1941. Theory and a group of illustrations from actual classrooms.
 3. Hopkins, L. Thomas: *Interaction*, D. C. Heath and Company, Boston, 1941. A book oriented to curriculum but containing many suggestions on planning.
 4. Ovsiew, Leon, and others: *Making the Core Work*, Metropolitan School Study Council, New York, 1951. A pamphlet which includes planning, among other aspects of core work.
 5. *Planning and Working Together*, Bulletin 337, State of Michigan Department of Public Instruction, Lansing, Mich., 1946. Includes local co-operative planning of curriculum units.
- ⁵ Kenneth H. Hansen, *High School Teaching*, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1957, p. 150. Reprinted by permission of the publisher.
- ⁶ Freeman Glenn Macomber, *Teaching in the Modern Secondary School*, McGraw-Hill Book Company, Inc., New York, 1952, p. 110.
- ⁷ Raleigh Schorling and Howard T. Batchelder, *Student Teaching in Secondary Schools*, McGraw-Hill Book Company, Inc., New York, 1956, p. 132.
- ⁸ Ralph K. Watkins, *Techniques of Secondary School Teaching*, The Ronald Press Company, New York, 1958, p. 68.
- ⁹ John Locke, *Some Thoughts Concerning Education*.
- ¹⁰ Gilbert C. Kettelkamp, *Teaching Adolescents*, D. C. Heath and Company, Boston, 1954, p. 103.



13

Discipline

The records of history show that men have always been concerned with discipline. Generation after generation has been accused of misbehavior, lack of standards, and lack of respect for their elders, in many kinds of societies through many eras. So teachers today are as concerned with discipline as ever. "He that spareth his rod hateth his son," says the writer of Proverbs. Perhaps from this concept grew the idea that discipline and punishment are synonymous. These terms cause great confusion; both teachers and parents speak of the child who is never disciplined, when they mean punished, or who has no discipline, when they mean that his actions are not curbed. In quite a different sense they speak of an adult who is disciplined; obviously they do not mean that he is punished. Many teachers equate discipline and punishment, or accord them a confused relationship.

Cutts writes that when a teacher speaks of discipline, he refers to order. He feels that "where disorder is the rule of the day a problem

exists."¹ It follows that when a classroom is orderly, every pupil quiet, no one being troublesome, discipline has prevailed. Yet order may be a questionable educational goal, whereas discipline certainly is not.

Let us, therefore, reserve our definition of the term, and turn now to examples of discipline problems in the classroom.

Discipline Problems

As many kinds of discipline problems exist in the classroom as youngsters. Sometimes teachers say, "I shall never cease to be amazed at the ingenious things young people can dream up to cause trouble." It is true that young people are creative and inventive. How much better if their creativity might be turned to learning!

Becky. An excellent student in the senior year in high school, Becky is socially well-adjusted and has potentialities for superior success in college. Yet Becky's one annoying habit causes disorderliness in many a classroom. She is constantly late. Somehow, between classes she forgets time and appears five or ten minutes late; or she becomes engrossed in an outside activity, which she is probably chairing, and as much as half a class period may pass by without her presence. She is such a good student that this habit does not interfere with her performance in class.

When Mr. S, the chemistry teacher, presents demonstrations to the class, he demands absolute quiet. If anyone coughs, he stops and waits until the disturbing sound has subsided. During one of his demonstrations, Becky quietly opened the door, ten minutes late to class, and began moving to a seat near by. Mr. S stopped and looked at her; all the class members turned to look at her; Becky tripped over a book and fell in a heap on the floor. With that, Mr. S's experiment, which he had neglected for a full half-minute, exploded prematurely. Becky's annoying habit had caused real difficulties.

Larry. Larry is a sophomore in high school and almost old enough to leave school. He makes no attempt to work with the class but is very ingenious in discovering ways to disturb the order of the group. Although Mrs. L has attempted in many ways to include Larry in the

¹Norma E. Cutts and Nicholas Moseley, *Teaching the Disorderly Pupil*, Longmans, Green & Co., Inc., New York, 1957, p. 1.

work of the Spanish class, he refuses to take part. Apparently he has real ability to close out class discussion, and he exercises it by deliberately planning ways to upset the group. One day, when several minor attempts had failed and the class had refused to give him so much as a glance when he tried to gain their attention, Larry opened the top of one of the desks at the back of the room and lit a fire. By the time another student had noticed it, it was blazing strongly.

Harry. In the seventh grade Harry is one of the brightest boys in his class. He participates in class work with great energy and engages in real thinking. But Harry often flings a retort to whatever is suggested, and shows disrespect for both the teacher and other students. "You're a bunch of sissies to do that silly work," says Harry when the class has decided upon a problem, thus upsetting equilibrium and undermining the confidence of the class. Or, "Mrs. P, you may think I'm going to go ahead and read, but frankly, I don't feel like it." The class members giggle, and Mrs. P must quickly redefine the class activity.

Ginny. A new girl in the junior year in high school, Ginny shows strong ambitions to be a private secretary and to excel, especially in English. The mores of the school tolerate little cheating, and ordinarily the teachers have few problems with it. During an examination, Miss U was startled to observe that Ginny sat with her book open, though the test was not of the "open-book" kind, and that under her book lay long pages of notes, which she carefully copied onto her paper. Because the problem was so unusual in the school, Miss U said nothing during the examination, but noted that Ginny copied from her book or her notes everything that she wrote.

Why Students Lack Discipline

If students continue to misbehave and teachers make no progress in the matter of discipline, there must be a reason for the constant opposition. We turn, first, to general causes, beyond the teacher's control.

When Teaching Is Not at Fault. We have said that adolescents exist in an ambivalent world where sometimes they desire to be independent and adult, and at other times wish they might return to the blissful state of dependence. Such wavering of desires causes the adolescent to wonder about himself and about how he ought to act. He has yet to rise to the maturity of knowing certainly what he wants to do. Becky

realizes that she should be prompt, but like a child she allows time to run on as it will, while like an adult she attempts to manage a great many activities in the school. Larry, like a dependent child, refuses to assume the slightest responsibility in the classroom so that, like an independent adult, he may leave school and go to work.

Because of this ambivalent state, adolescents, unable to weigh all possibilities objectively—viewing some of them in a childlike manner, yet often acting upon others with real maturity—are likely to behave in a way which seems, to a more objective adult, undisciplined. As Woolf and Woolf phrase it, our culture makes it difficult for a child to know what to expect of himself.² That is, he may weigh some of the possibilities of his action in an adult manner, see accurately what our culture would expect of him (Ginny knows cheating is considered wrong), but he may still have needs which must be satisfied in a childish way (Ginny would rather be called successful than good). These he cannot weigh maturely; he weighs them as he did when he was a child, and then they were perfectly acceptable. "How come," he wonders, "they aren't acceptable any more? When did things change? Who changed them? I want them the way they have always been." So Becky wants to continue heedless of time as always, and Larry heedless of responsibility in certain situations, and Ginny able to make the end justify the means. They fail as yet to understand why they must find love, security, belonging, and success in a new and different way, why these needs are no longer met exactly as they have always been met before. Thus, as Hymes so aptly puts it, a child in trouble is not deciding to be bad but cannot decide to be good.³ A disorderly, disobedient youngster has not objectively weighed all the possibilities and then decided upon the bad action. He cannot as yet weigh possibilities; he still must meet some of his needs in the old familiar way. Here, then, is a reason why adolescents misbehave.

Let us remember that behavior which an adult calls "wrong" is never completely satisfying to the youngster who misbehaves. Smith explains that such behavior is not satisfying because adults disapprove, but that it is somewhat satisfying because the youngster earns a form

² Maurice D. Woolf and Jeanne A. Woolf, *The Student Personnel Program*, McGraw-Hill Book Company, Inc., New York, 1953, p. 152.

³ James L. Hymes, Jr., "The Old Order Changeeth," *NEA Journal*, vol. 42, pp. 203-205, April, 1953.

of success—he is successful at misbehavior.⁴ Thus success at misbehavior may, in itself, be a motive for misbehavior. Whatever the teacher may offer a boy as reward or punishment will not bring enough pleasure or pain to warrant his relinquishment of what he knows will bring him success.

Leaving this diagnosis, we turn to psychological research, all of which shows that constant disorderliness means unsolved personal problems.⁵ The student who whispers occasionally, the one who chews gum, the one who is quick with a retort, the one who talks too loudly or laughs too often, all of these boys or girls are showing normal, adolescent reactions. But the youngsters who, like Larry, constantly misbehave, constantly disturb and disrupt the class, need special help. They have a difficulty which is so great that the ordinary experience of the classroom fails to meet it. If we assume that poor teaching does not cause a boy's insubordinations, then we may look for certain other causes. Perhaps the administration has prescribed an unsuitable curriculum; perhaps his environment has forced him into a group whose mores favor delinquency; perhaps he lacks one of the vital satisfactions in a young person's life. Then, having found success in misbehavior, the student may persist in making trouble because at least one of his needs is met in this way. If a student follows this pattern, he should have expert help from the guidance department.

All misbehavior, then, when teaching is effective, follows from inability to find satisfaction in a way which seems acceptable to the youngster himself. And, as we have said, his wavering between childhood and maturity makes him cling to some childish patterns which formerly brought pleasure, instead of trying an adult prescription for behavior which as yet seems unattractive. For most youngsters this reaction occurs only infrequently; for only a few, does it follow a repetitive pattern.

When Teaching Is at Fault. Some educators and teachers claim that no disciplinary problems occur if the teacher is talented. Obviously, as Larry shows particularly, and Becky and the others to a lesser degree, some sorts of disciplinary problems may exist in spite of the teacher's talent. However, where the teacher forms a coalescence of needs with teacher aim for thinking, only a few such problems will appear. New

⁴ Henry P. Smith, *Psychology in Teaching*, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1954, p. 403.

⁵ Cutts and Moseley, *op. cit.*, p. 3.

teachers are often elated to discover that when their teaching is effective, misbehavior vanishes. Poor teaching, which does not aid the student to solve his own felt difficulties, directly causes restlessness. In our observation of hundreds of secondary school classes, we have rarely seen a disorderly or disobedient student when the teacher taught effectively. But when the teacher was dull or unsure, we have observed students engaged in every sort of activity from carving desks to filing the nails of the boy in the next seat.

A second area where teaching is at fault, directly causing discipline problems, is the setting of impossible standards. Students who are sent to the principal if they whisper or chew gum or pass messages or sometimes fail to note that the teacher addresses them, live in a situation where no adolescent feels free enough to think for himself. Groups of students sometimes experience bad days, as individuals do. If the teacher sets impossible standards for those days, and does not allow the youngsters to be a little too noisy once in a while, the class cannot function. If they know that their exuberance on a warm spring day will result in an hour's detention after school, cutting off even more of the wonderful weather, it is little wonder they become a "problem" class.

A talented teacher is neither ineffective in teaching nor rigid in standards of conduct. He understands himself and knows what he teaches; and because he understands adolescents, he sets standards which he realizes they can keep as they develop a sense of self-respect. Comenius was not far wrong when he wrote: "No blows should be given for lack of readiness to learn because if the pupil fails to learn readily, this is the fault of no one but the teacher, who either does not know how to make his pupil receptive of knowledge, or does not take the trouble."

Need of the Teacher for Order, Authority, Control

Some individuals need to feel themselves the sole authority, the dictator; teaching in an autocratic manner satisfies a basic maladjustment within them. Let us examine this need as it applies to discipline problems. "Most parents and conservative teachers," writes Burton, "mean by order a situation free from annoyance to themselves."⁶ The

⁶ William H. Burton, *The Guidance of Learning Activities*, 2d ed., Appleton-Century-Crofts, Inc., New York, 1952, p. 708.

person in authority, in other words, tolerates no occurrences which annoy him, "which interfere with my teaching," "which upset my class," "which disturb my students." Discipline problems are annoying, upsetting to routine, confusing, not planned, and therefore unnecessary. The talented teacher, on the other hand, understands and controls his need of authority, and does not blow up his chemistry experiment along with his blood pressure because a student arrives late to class. He waits for Becky calmly, realizing that the girl needs assistance in learning to be helpful rather than annoying to others. He does not judge discipline in terms of himself. As Burton adds, "Discipline is not a matter between the teacher and a pupil but between the pupil and his social group."⁷

Thus we move to the teacher's aim. If his aim is to control his students' actions at every turn, he will enforce order. If personally he needs to be the dictator, to make certain that "the pupils under me behave," then he will be strict and unyielding. But Symonds says that control is not an educational aim, and that it is more important to show the child he is understood than to force him to submit to authority.⁸ The teacher who needs to be the sole authority should not attempt to alleviate disciplinary problems by punishing his students; he should look to himself, to his desire for power, and indirectly to the effect of this uncontrolled ambition upon his teaching. If he can curb his personal need, many of his problems in the classrooms may solve themselves. Furthermore, if he feels that order is the ultimate proof of good discipline, he needs to examine his aim for thinking in the light of his aim for order.

In *Emile* we read: "If you substitute in the student's mind authority for reason, he will no longer reason, but will be but the sport of others' opinions."

Do the maintaining of order through teacher authority and the hope for student thinking supplement one another, or are they diametrically opposed? If order is maintained at the subordination of everything else, does the student learn to think?

The teacher says, "If you upset the class, you will be sent to detention."

⁷ *Ibid.* p. 719.

⁸ Percival M. Symonds, "Classroom Discipline," *Teachers College Record*, vol. 51, pp. 147-158, December, 1949.

The student's mental response may not be at all what the teacher imagines it. The student thinks, "I won't be upsetting because it isn't worth it," or "I'll be upsetting anyway because the success I get from that outweighs the detention," or, "I wonder how much I can get away with before she really does it." Seldom does he think, "I wonder whether it's right to upset a class. I wonder whether it is something I should do, and if it isn't, why I shouldn't do it?" In no way, in other words, does he consider the problem personal and thus begin to define personal hypotheses in relation to it.

If the teacher must be the ultimate authority and if rigid order is to him the ideal atmosphere of the classroom, he defeats his expressed aim—thinking by his students. His actions belie his words. Everyone, of course, wants a portion of authority. The important requirement for the teacher is only that this desire be controlled and kept secondary to promoting thinking in students.

Critical Thinking about Conduct

The teacher who truly teaches to promote thinking in students does so in every experience in the classroom. He does not promote thinking in the subject matter of courses and follow an opposite policy with student action. He consistently holds his aim before him for every student experience. Thinking is certainly as important in the area of students' behavior toward one another and the teacher as it is in English or French. The talented teacher does not inconsistently place order in the classroom as his major objective for student action, while he holds an entirely opposite objective for the teaching of course material. He will help Becky to think about her lateness, to delve into the heldover childish need for an indulgent, undemanding world which she is trying to satisfy, to consider instead the needs of others, and to weigh whether she should continue her thoughtless behavior or attempt to stop it. If the problem is emotionally deep, Becky may need expert help from school counselors. In like manner the teacher tries to deal constructively with Harry and his hasty retorts and with Ginny and her cheating, and he at least makes an attempt with Larry. For if he believes in thinking as his aim, the teacher realizes that he must ask students (and himself) to think about all that occurs in the classroom.

The implications of thinking about actions in the classroom are far-

reaching. Both student and teacher, aiming for such thinking, discover that as a student evaluates his experiences, considers and weighs possibilities, he becomes involved directly with morality. Nowadays the teaching of morality is far more controversial than it was when the McGuffey readers were the fare for all students. Teachers do not oppose moral teaching, but they attempt, very often, to ignore it. Actually, if they believe in discipline, it follows logically that they must become involved with morality.

In the book *The Public Schools and Spiritual Values*, we read that a student's evaluation of his experiences in the classroom takes in such steps as being sensitive enough to realize that evaluation is necessary; considering not only how he feels now, but how he will feel; weighing and considering not only his own wishes, but the wishes of others involved.⁹ In other words, the teacher who tries to help students to think about their experiences involves them in moral evaluation. As Mr. S asks Becky to think about her lateness, he helps her to feel the need to consider the habit, to phrase a problem in relation to it which is in terms of ought. "Ought I or ought I not to continue to be late?" Becky would ask. At step 3, Mr. S would help her to put into words the many considerations involved, such as: "My habit of being late is disturbing to other students; it often delays others; it is not a sign of maturity; there are things which take place that I miss." With further questioning about her reasons for being late, Becky may add, "I just do it because I always have and people have always liked me in spite of it, or maybe I thought they liked me because of it, or it proved that I was liked because people didn't avoid me even though I annoyed them." Becky may then move to a judgment and its relationship to her life, "I ought to try not to be late because there are not enough reasons to prove that it either helps me or helps others, but I should realize that changing a habit takes effort." (The latter part of her conclusion would result from information about habits provided by the teacher.) Becky has followed through the steps of critical thinking; and the process is synonymous with moral evaluation because the decision involves "ought,"—what one should do. No teacher may decide what a student ought to do. As in all forms of thinking, decisions about an ought must remain with the individual.

⁹ John S. Brubacher (ed.), *The Public Schools and Spiritual Values*, Harper & Brothers, New York, 1944, pp. 29-30.

Brightman writes, "Moral experience occurs whenever there is a feeling of obligation or choice between what is felt to be better and what is felt to be worse."¹⁰ Thus if Becky followed through the steps of thinking, making a deliberate choice in favor of promptness because she felt it a better choice for herself and others, she experienced a moral choice.

A student does not usually think toward a choice alone. The teacher helps. At step 1 Mr. S held a conference with Becky and said, "Becky, I wonder about your being late so often. Do you ever think about it?"

Becky answered that she knew she was often late, but it never bothered her.

MR. S: You don't think it's much of a problem, then?

BECKY: Well, I know it annoys some people, but I always think I do so many other things that it's all right.

MR. S: Your activities otherwise make you feel that lateness is all right.

BECKY: Not that it isn't annoying, I realize.

And so, with Becky's lateness serving as the introduction to a conference, the teacher attempted to help her to anxiety about her habit.

At step 2 he asked her to phrase her problem. "What do you think you ought to do, Becky? Ought you to continue to be late?" Thus he helped Becky to express in terms of moral choice her definition of the problem.

Becky here stated her problem, "Ought I to continue to be late?" If she had not worded it in such terms, the teacher would have asked that she do so.

At step 3 Mr. S said, "Try to list all the things involved in your lateness, from your point of view and from that of others. This will help you to decide what you ought to do." As Becky considered herself and others, if the teacher felt she had omitted anyone, he asked, "Do you think your lateness makes any difference to Jim or Carol or John?" At this point he also asked, "Why do you think you act as you do?"

A student usually has no ready answer to this question. If he finds no reasonable explanation, his motiveless behavior is evidence that the

¹⁰ Edgar S. Brightman, *Moral Laws*, the Abington Press, Nashville, Tenn., 1933, p. 53.

difficulty is deep and that he needs expert counseling. Becky, however, phrased some possible plausible reasons, all of which were probably involved.

Becky then felt she was ready to form a hypothesis; but the teacher, knowing that her lateness was a fixed habit, explained briefly how such habits continue even when one intends to break them. When Becky phrased her hypothesis, if she had failed to include such information, he would have asked, "What about this old habit that you have followed so long? Hadn't you better recognize it?" But she came through with all the final steps of critical thinking. She phrased her hypothesis, "Being late doesn't help anyone, but it's a hard habit to break," added an appraisal, "I'll have to keep remembering that it's hard to overcome," and finally stated her judgment, "I ought to do so."

All action which a teacher terms honestly a discipline problem needs such evaluation. Moral training is not a mysterious process about which no one knows very much. Like any form of problem solving, it is merely thinking which involves "deliberate action, conduct into which reflective choice enters."¹¹ The teacher asks that as a result of moral evaluation, or thinking, the student make the choice of doing what he believes is right. If his decision, carefully arrived at, differs from the teacher's, the teacher who believes honestly in thinking by the student must accept such a decision. No other recourse remains after the student has been helped to engage in thinking. The teacher is wise, however, if in the beginning he sets standards which are possible for adolescents to meet.

Such freedom of choice might appear most unwise if the teacher held no belief about man's possibilities for improvement. If "In Adam's fall, we sinned all," and our natural state is evil, then allowing students to make decisions would be gravely dangerous. But if the teacher believes that everyone has possibilities for improvement and change, that he can aspire to and at least partly achieve high ethical and moral values, then no more grave danger exists in allowing moral choice than in not allowing it. (It goes without saying that the choice must be within the limits set for classroom behavior.) If no opportunities are provided for such choice, no learning will result and a student's decisions will remain haphazard, based upon the whim of the moment.

¹¹ John Dewey, *Human Nature and Conduct*, Henry Holt and Company, Inc., New York, 1922, pp. 278-279.

If real choice is urged upon students, and the teacher believes that they have possibilities for improvement, thinking should aid them to make sound judgments and to learn something about the greatest good for themselves and others. In addition, as the Educational Policies Commission says, when no reconciliation of conflicting values can be found, students can learn to make a choice of a course of action in terms of anticipated consequences, that is, to make a judgment as to which course "is the ethical imperative."¹²

Such thinking may occur, also, with the total group. If the class members refuse to keep their voices low, laughing and giggling and paying no attention, the teacher may lead the group through the steps of critical thinking involving moral choice. If a small group is exceptionally disorderly, the teacher may call them together and ask them to make a choice about their action. As a further step, the teacher may ask the class to consider what should be done with students who act in a certain way. For instance, after Becky has arrived late a number of times, but not so immediately after her entrance as to cause Becky too much discomfort, the teacher might say, "I notice that some of you seem to come to class five or ten minutes late. Now I know that you don't intend to be late, and time gets away from you; nevertheless, promptness is supposed to be a virtue. Do you think we should try to get people here on time, and if so, how could we do it?"

With Larry, he might say, "Some of the members of the class seem uninterested in solving problems with the rest. We all want this class to work together, I think. Or do you feel we shouldn't try to involve everyone, if some want to remain outside of group activities?"

Referring to Harry, the student who has too many quick retorts, the teacher might say, "Some of you can think of some pretty smart replies or comments to make about things that take place in class. I know that when you are with your friends a quick answer is a real asset. But is that true here in class? What reactions do you members of the class have to that sort of thing? Do you feel we should try to do anything about it?"

Helping the total class thus to go through the steps of thinking about a disciplinary problem, the teacher may lead one or two individuals to a moral evaluation of action which up to that moment had been

¹² *Moral and Spiritual Values in the Public Schools*, Educational Policies Commission, National Education Association, Washington, 1951.

only heedless. With the addition of a personal conference and further thinking, many difficulties should be removed.

The teacher's aim for thinking, then, as it applies to discipline, presupposes that the teacher will aid students to consider moral choices in their actions. Such steps of critical thinking occur also at the preventive stage. If the teacher foresees opportunities for cheating, he may ask, "What will you do in the examination tomorrow if someone cheats? Why do students cheat?" Thus he helps students to make a moral choice before the temptation is presented. The teacher who watches constantly for opportunities for moral choice will discover that they arise often. If he avails himself of them, some discipline problems will be averted. If he follows through with moral thinking after a discipline problem has occurred, he will alleviate still others. Those which remain should be referred to experts for guidance.

Punishment or What?

Possibilities remain in the area of discipline which still must be considered. We stated originally that many teachers hold that discipline is synonymous with punishment. Thus the question still pending is whether or not the teacher should engage in punishment. Many professional educators oppose punishment as either harmful or wasteful. Burton says, "Reliance on punishment and upon strong-arm methods is wasteful and truly stupid when methods are available which are demonstrably more effective."¹³

Symonds feels that punishment is harmful. He writes that punishment leads to anxiety, inhibitions about punishment, a tendency to counteraggression, and then a need for punishment to expiate guilt.¹⁴ Little has been written in favor of punishment, particularly as a means to improved behavior. Research has not proved that because a youngster is punished for an act considered by an adult to be wrong, he therefore learns not to repeat the act. He may choose to repeat it because, as Symonds says, he needs the punishment to relieve his guilt feelings, or because, as Smith says, he finds success in misbehavior in the fact that he is noticed and leads someone to take action with him. Or he may merely decide, "This teacher is strict, and I'll have to watch

¹³ Burton, *op. cit.*, p. 726.

¹⁴ Symonds, *loc. cit.*

out," or "This teacher means nothing, and won't carry out his threats." In few instances does he learn anything about the act which he performed; instead, he learns about the teacher's character.

If, when Becky is late to class and upsets his experiment, Mr. S punishes her by sending her to the principal or to detention, or even by expelling her from his class, Becky will not learn to be prompt. She will learn, "Mr. S is unreasonable to blame everything on me; he should be less rigid. I'm being punished, and I don't really deserve my punishment."

If Mrs. L punishes Larry by keeping him after school to do the lessons he failed to do in class, Larry will not learn to be responsible. He will learn the quickest and easiest way to satisfy Mrs. L, or perhaps he will continue to refuse to learn anything. If Ginny is punished for cheating, it is unlikely that she will learn not to cheat. She may, however, learn how to cheat by more subtle means. Therefore the thoughtless administration of punishment becomes suspect.

Punishment with Reservations. Cutts writes that a high school student shrugs off punishment but responds to reason and discussion.¹⁵ A conference, such as the one described, involving the consideration of moral choice should be more helpful to the student than punishment. In the junior high school, too, if the student verbalizes well, a conference is of value. The conference forces the student to consider the repetition of the action in which he engaged. If results are obtained, they are more likely to relate to the original, undesirable action than are the results of punishment.

Many kinds of punishment are possible, the most common in the secondary school ranging from detention and a visit to the principal or disciplinary officer to remaining after school, undertaking added academic work, being deprived of privileges, being expelled from class for a period of time or from school itself. We cannot say that punishment should never be administered; but if it is meted out by a teacher, we suggest that it should be related to the possible repetition of undesirable behavior and that it should be immediate. Keeping a student after school on a following day or depriving him of next week's privileges will occur so long after the act itself that the student will lose the sense of the relationship in the time lapse. If Ginny cheats and is punished by being sent to detention for two weeks after school or dur-

¹⁵ Cutts and Moseley, *op. cit.*, pp. 141-142.

ing an activities period, she is unlikely to realize a relationship of the detention to the repetition of the act of cheating. But if she is punished by being asked to remain after school to take the examination without notes, she may decide not to repeat her action. We believe that the best form of punishment results from the conference with the student or group on the question, "Now what should be done about what you did?" This would occur at the last stages of critical thinking. If the student himself feels that he deserves a punishment, then its relationship to his act is strongly established. If Becky says, however, "I don't feel I should be punished, because what I did was thoughtless. Now I have thought about it. If I do it again, though, after thinking about it, I think I should get punishment," then the omission of punishment, which research shows is usually wasteful or harmful, will not be a grave omission.

Setting Limits. Assuming that after students have engaged in misbehavior the teacher aids them to think about their action and to make a moral choice in relation to future behavior, and that he uses punishment only with careful consideration of outcomes, we need still to consider the matter of preventive action. Every teacher needs to set limits for behavior, but, as we have said, they cannot be so rigid as to be impossible of attainment. Preferably limits should be set in cooperation with students.

Obviously no good teacher wishes his classes to "run wild," or to be so noisy that the class in the next room cannot function, or to be so free that they walk up and down the corridors because they feel a whim to do so. No teacher wants fires in desks or too many hasty retorts or cheating. Once in a while, however, any one of these things may occur even in the best teacher's class. The teacher must evidently decide exactly what he cannot allow and set some limits. He may say, "In this class you must stay in the room unless you get my permission to leave. You may talk with one another, provided you talk very softly so as not to disturb others. But if I or one of the students is addressing the group, you will be expected to be quiet. You may get up and move around the room if you have some reason to do so; otherwise I shall expect you to remain in one place. We can't try to learn with too much undercurrent of noise and activity." Then he may add, "Now let's take these rules, one by one, and discuss them. You may tell me if you feel that any one of them is unfair or too harsh."

Moving to another phase of his teaching, he may follow the same procedure. "I am going to tell you what I shall expect of you, and then we shall discuss that, too. I shall expect that you will work as hard as you can to learn, that you will cooperate with me and with one another in order to learn, that you will remember that my hope for you is that you will think about whatever we are studying and thus that you will learn." Also, when specific possibilities for misbehavior arise, he will again announce his expectations: "Tomorrow on the field trip I shall expect each one of you to move quietly through the plant without talking above a whisper," or, "Tomorrow on the examination I shall expect each one of you to do his own work and not to discuss anything with another student." Always he offers opportunity for discussion so that students may think about the limits he has set.

Beforehand the teacher should engage in personal thinking about the limits. For example, he may decide that students should not cheat. But he should remember that one aspect of morality and religion is to help one another; if he never allows such help to be offered, his definition of cheating is certainly too uncompromising. Also he should certainly assume responsibility for using testing devices which do not make the temptation to copy from another too great. When an arbitrary limit of any sort is established, the teacher must define it precisely, and then help students to discuss it so as to make evident the many implications which do not at first appear when one declares, "Students should not cheat."

Students should respect property. But teachers, with students, need to examine the implications of this statement, too. Are there enough chances for releasing exuberance? Are there places where youngsters may draw pictures? Are they helped to care for equipment, to consider its cost directly to their own parents and thus indirectly to themselves? If the rule is established too arbitrarily, the teacher should not wonder that it is not kept. He might for a moment examine his own morality. Does he say, "This speed limit of fifteen miles an hour is unfairly slow, and therefore, I'll go twenty-five"?

Students should respect their teachers. But a moment's thought may raise the disturbing questions, "Are all teachers worthy of respect? What is respect? Is it something given automatically?" Respect, after all, must be earned to be real. To establish an arbitrary standard for respect of oneself shows too much need to be the authority.

Students should be punctual. Yet is it more important to be on time to a class than to stop to watch a robin building his nest or to talk with the health teacher about a school assembly in which a particular student has a part? Actions are so attended by reasons and possibilities that rules and regulations and limits, which on the surface would receive 100 percent support, may need careful questioning. The teacher, then, must consider the limits he sets carefully in the light of his aim for thinking. Ann may engage in a lot more thinking watching that robin than she would in class. He must take care, also, to set as few limits as possible; too many rules are confusing. He must offer opportunities for students to discuss the standards set and to propose amendments or changes.

Setting limits is a dynamic process. It does not happen the first day of class and that is the end of it. Each time student action infringes upon one of the accepted standards, further discussion must follow, with the student alone or with the class as a whole. But setting limits will steer a good deal of action onto the side of a right moral choice.

Thus the answer to the question, "Punishment or what?" remains an enigma. To say definitely that one should never punish is to make a broad generalization. We say only that the teacher should administer punishment with careful thought, if at all; but to avoid having to punish very often, he should set thoughtful limits and then help students who have misbehaved to engage in thinking about their action.

* * *

Life is filled with temptations and choices. An adolescent possesses only a little experience with making choices and limited learning about how to evaluate all the possibilities involved. And as we have explained, he still clings to many childish patterns. He often does not know how to decide to do what is right.

The hope of the talented teacher is that, within the experiences of the classroom, students may be led to think about their actions—future, present, or past; that through the steps of critical thinking they may be helped to form the habit of making careful moral choices and to consider whom they benefit by their choices. The talented teacher does not shy away from moral teaching, because he realizes that if he is to be involved with discipline and to help students to take action in cases of discipline, he automatically becomes involved with morality.

The teacher cannot make moral choices for students any more than he can make other judgments for them about the results of thinking. He must aid students to make their own moral choices; his responsibility is to be certain that they engage in real thinking which weighs all possibilities. He must help them to realize that generally many possible choices exist, rarely only two.

What, then, is discipline for the talented teacher? It is aiding students to think about their conduct and to make moral choices in action, either proposed or past. Discipline is neither punishment nor order. It is involved only slightly with the relationship between the teacher and the student, but it is involved with the student's whole approach to his actions and his decisions about the nature of his life—what he ought to do and what he will do. The close relationship of moral choices to the setting of goals is therefore evident. If the student decides that he ought to do something but fails to carry through his decision, further thought about his action, his reasons, his goal, may be needed before the ought becomes strong enough to outweigh other needs.

The learning which the reader has gained from this chapter on discipline may be very different from our hope. His personal concern with keeping young people in order may outweigh the consideration about what he ought to do in promoting thinking in his students. It is our hope that because he is a really talented teacher, he will find very few disciplinary problems, and that he will therefore be freed from too great anxiety. As a result we hope that his actions in dealing with classroom behavior may follow quite freely from his moral decision in the matter rather than from his pride or sense of expediency.

LEARNING MATERIALS

Some Cases

1. The teacher sighed, "Today Betsy giggled during the entire class. Jodie didn't participate at all as usual. Lonie kept talking loudly. And Marvin tripped up Bonnie as she was moving a bowl full of fish. I guess I don't have any discipline." Do you agree, and how might this teacher be helped?

2. The student said, "When I do wrong, I don't mean to. I really intend to be good."

The teacher replied, "If you intended to, you would. I've heard alibis before. Do it right next time."

Why is the teacher's reply useless for promoting self-discipline?

3. The teacher said, "I believe in schedules. Shakespeare at 10:10; book reports at 10:30; grammar at 10:45. My students are always orderly as a result." Do you believe the teacher's views of discipline, order, authority, and setting limits are justified?

4. The student said, "I know I ought not to keep making loud remarks, trying to be funny. But they just pop out."

The teacher said, "Do you know why they just pop out?" He leads from there into a weighing of the desire for overt attention against the desire for more silent approval by peers and teacher.

The student makes a moral decision. But the teacher has not yet entirely fulfilled his role in discipline. How would he continue his help and why?

5. The teacher said, "I find if they know that bad behavior means detention, they behave. There's nothing to discipline." How does this teacher define the term, and why does he fail to see that real discipline does not exist in this situation?

Some Controversial Thoughts

1. "The spontaneous wish to learn, which every normal child possesses . . . should be the driving force in education. The substitution of this force for the rod is one of the great advances of our time."¹⁶

2. When discipline is weak, "something . . . has failed; . . . a child is unhappy. . . . Everybody is in danger."¹⁷

3. If the teacher tells the class that they may run things and thus achieves only chaos, the way to solve the difficulty is not "severe disciplinary measures."¹⁸

4. Punishment is successful when the child reacts favorably knowing "that he brought it on himself, that his behavior was wrong, and that he knows and prefers the correct behavior."¹⁹

5. "He who has no mastery over his inclinations, knows not how to resist present pleasure for what reason tells him ought to be done, wants virtue and is unlikely to be good for anything."²⁰

6. Teachers who know mental hygiene "become less concerned with the maladjustment of the child as a disturbing force in an orderly school life and become more concerned with it as a destructive force in a child's life."²¹

¹⁶ Bertrand Russell, *Education and the Good Life*, Liveright Publishing Corporation, New York, 1926, p. 42.

¹⁷ James L. Hymes, Jr., *Behavior and Misbehavior*, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1955, p. 3.

¹⁸ Dugald S. Arbuckle, *Guidance and Counseling in the Classroom*, Allyn and Bacon, Inc., New York, 1957, p. 105.

¹⁹ Noble Lee Garrison, *The Improvement of Teaching*, The Dryden Press, Inc., New York, 1955, p. 359.

²⁰ John Locke, *Some Thoughts Concerning Education*.

²¹ Jane Warters, *High School Personnel Work Today*, McGraw-Hill Book Company, Inc., New York, 1956, p. 64.

7. "Most delinquents show a history of dislike of school," with such concomitants as inability to master subjects, discouragement and retreat from embarrassing classroom experience, and resentment against harsh teachers.²²

8. If a young person can be induced to follow the process of acting on thinking, one can be reasonably sure of his building a moral character that is intelligently effective.²³

Suggestions for Further Reading

1. Baruch, Dorothy W.: *New Ways in Discipline*, McGraw-Hill Book Company, Inc., New York, 1949. Although this book is about discipline of young children, it contains many excellent ideas which could be applied in the secondary school.

2. Johnson, Earl A., and R. Eldon Michael: *Principles of Teaching*, Allyn and Bacon, Inc., New York, 1958. Chapter 13, "Responsibility for Self-discipline and Control."

3. Kvaraceus, William C.: *The Community and the Delinquent*, World Book Company, Yonkers, N.Y., 1954. A complete coverage of delinquency including understanding it, legal aspects, community action, treatment.

4. Sheviakov, George V., and Fritz Redl: *Discipline for Today's Children and Youth*, The Department of Supervision and Curriculum Development, NEA, Washington. Copyright, 1944. A paperback which realistically tackles the aims and means of discipline.

5. Stewart, Robert S., and Arthur D. Workman: *Children and Other People: Achieving Maturity through Learning*, The Dryden Press, Inc., New York, 1956. Part V, "Discipline."

²² Lester D. Crow and Alice Crow, *Adolescent Development and Adjustment*, McGraw-Hill Book Company, Inc., New York, 1956. p. 349.

²³ John S. Brubacher (ed.), *The Public Schools and Spiritual Values*, p. 109.



14

Evaluation

A weighty question looms before the teacher as he approaches the matter of evaluation. Why evaluate? Is there any real purpose in doing so?

The answer is neither, "To give a grade," nor, "To compare one student with another." In a Shakespearean sonnet we find the line:

And like enough thou know'st thy estimate.

Can there be any other real purpose for evaluation of a student and his achievements than that he may know his estimate? To evaluate is to appraise, to estimate, to judge. The student who evaluates his new judgment in comparison with old understandings establishes a basis for deciding what he needs to know and for estimating his progress toward critical and creative thinking.

A teacher's evaluation rarely offers such an estimate. The student

says, "In relation to what the teacher thought I ought to know, I got a D, but I think I learned a lot." He is evidently confused about the goal of learning (Is the aim to memorize what the teacher wants you to know?), as well as about the reason for evaluating (Do you evaluate in order to compare my score with what the others scored?). Real evaluation helps the student to estimate his own progress in relation not to others but to the aim of learning, which is critical thinking. Glenn knows that he has arrived at judgment in many subdivisions of his study of book reporting; he knows what he still needs to learn; and he has a sense of achievement about the judgment which he has attained as well as a clear understanding of the means by which he attained it. How much more meaningful and valuable is such an estimate to the student than a stark B or F! A talented teacher has held in mind for his students the goal of thinking toward judgment, and in evaluation he has emphasized this process.

Two Classes

Miss M feels sure that her classes are the best organized in her school. She plans specific events for each day of the week. Friday is always test day, and the entire work of the week is aimed toward the hour test on Friday morning. She corrects tests over the week end and passes them back to the class each Monday. We have observed mixed emotions in that class on Monday. The boy or girl who scores 90 per cent or better smiles, talks loudly and boastfully, and holds the test paper up for all to see. But here is a pupil with 55; he glances about to discover who has seen his mark, looks guilty, then tries to pass off his grade to his peers as a joke. He and the others with low scores seldom look at their mistakes; they discard their test papers in the waste basket as soon as they get near it. Miss M plans her Monday program so full of activities that she has no time to discuss mistakes, but says she is available as usual every day after school for fifteen minutes and for a full hour on Wednesday.

Miss D has personal ideas on evaluating student progress. She emphasizes each student's own judgment of his solutions to learning problems. She discusses with individuals and groups their progress toward the objectives of learning. She encourages and sometimes requires written reports and progress check lists. Her students take few exam-

inations, since she feels that passing an examination reveals little of the results of learning. She administers standardized achievement tests to diagnose difficulties and to measure progress toward overcoming these difficulties. She and the class agree sometimes that a test should help them pull together their learning about a major problem of the unit. Often these tests are given when students feel they are ready. Sometimes they are mere skill-type tests; at other times the form is an hour-long examination on the major problems the class has solved. Papers are not graded, and each student corrects his own work in order to discover immediately his mistakes. On occasions (especially when essay questions are given to measure application of the students' learnings to a new situation), Miss D reads papers and writes comments at the end about thinking and progress toward judgment. Pupils maintain personal records of their strengths and weaknesses in notebooks.

When the time comes to send grades to the office and home, Miss D refers to her carefully kept notes and records of each pupil's performance, and her pupils review their own progress records. They then spend several days in evaluating together each student's growth and change and in assigning a grade that seems fair to both. While this process goes on in conference between the teacher and individual pupils, the rest of the class reads, writes, practices a skill, or starts to develop an approach to the next problem.

Miss M might be called a tester. To her the test is a tool to motivate pupils and a goad to keep the class to a task. Miss M feels that everything learned can be measured and given a numerical value. Her pupils are compared with one another, but the stages of their own intellectual growth are not compared. Miss D, on the other hand, looks beyond testing; her sights are set on measuring higher understandings. She holds no test or its score over her pupils as a means of motivation. Each teacher's incentive (as we have pointed out in a previous section) is unmistakable. The pupils in Miss M's class learn to pass the test (the incentive) and shortly thereafter often forget the material memorized. Miss D's class is motivated by personal needs; they learn material which will assist them to solve a problem falling within one or more of the problem areas. They usually learn, in other words, the process and the material covered. They make judgments about themselves from many approaches, not just in comparison with others. Such an approach

to evaluation does not imply that paper-and-pencil testing is undesirable, but merely that Miss M, and many like her, mistake a means for an end. A relationship exists between testing and evaluating, but the two are hardly synonymous. Testing and measuring of learned information and attitudes are means, but not the only means, to be utilized in order to arrive at the kind of evaluation which is the pupil's estimate of his own progress. "Measurement is a basic part of the evaluative process."¹

The purpose of this chapter is not to cover the content of a typical tests-and-measurement course, which should come early in a teacher's graduate program if time does not permit it at the undergraduate level. Our purpose is to discuss testing as a part of the total evaluation process; to explain how teacher-made and standardized tests should be used by the talented teacher; to show how teachers and students may work together to make evaluation a daily experience and one which promotes thinking; and finally to show how they may assign together the typical numerical or alphabetical grade.

The Meaning of Evaluation

Schwartz and Tiedeman write, "Evaluation is, basically, a process of determining the nature, the extent, and the desirability of the changes that occur in a student as he grows and develops."²

Such evaluation, to be effective, must in the long run include self-evaluation. "Many educators believe that the students should have a part in the evaluation of their progress. The values of self-evaluation have already been stated as including these factors: (1) It tends somewhat to remove evaluation from a category of being imposed from without, and consequently tends to improve the relationship between the student and the teacher and the student's attitude toward measurement and evaluation. (2) It gives the student valuable training in self-analysis which will carry over into out-of-school life at present and in the future, and it develops an attitude toward skills and evaluation which will always be useful to him."³

¹ Alfred Schwartz and Stuart C. Tiedeman, *Evaluating Student Progress in the Secondary School*, Longmans, Green & Co., Inc., New York, 1957, p. 2.

² *Ibid.*, p. 17.

³ Hubert H. Mills and Harl R. Douglass, *Teaching in High School*, 2d ed., 1957, The Ronald Press Company, New York, p. 377.

Evaluation, then, means judgment by a teacher and the pupil on progress in critical thinking in the classroom, on weaknesses which may still exist, and on places where learning needs to be stressed. The judgment is not a subjective opinion alone, but is an estimate based on an interpretation of all the various measuring and rating devices. These devices, as we explained in discussing Miss D's class, divide into three areas: standardized tests and teacher-made tests, reports by the teacher and by the pupil, and conferences between teacher and pupil. Like all teachers, Miss D did employ some subjective measures. She probably had to say to herself at times during the year, "Jane did poorly on her theme and her unit test was weak, but since I know she has more ability, I feel I want to give her a higher grade than perhaps objective measures permit." She discussed this with Jane and both agreed upon a higher rating than was indicated by measuring instruments.

Miss M bases her evaluation on an average of test scores and claims that thus she omits entirely her subjective views. But can a teacher avoid subjectivity when testing? The selection of the content of a test involves a teacher's opinion of what is important. No teacher can measure all his pupil's learning; therefore, though measurement may be statistically objective in its grading, it is very subjective in the selection of content. For these reasons real evaluation must be a continuous daily process in the classroom, where the teacher and his pupils use various measuring and rating devices to estimate general and personal progress toward the solution of problems, that is, progress toward judgment through thinking. Although evaluation aims to offer the student an estimate of himself, it will obviously, at the same time, offer the teacher something of an estimate of the effectiveness of his own teaching.

A measuring device, such as a standardized or teacher-made test, is said to be valid if it measures what it is supposed to measure. If a test in geography is designed to measure the pupils' ability to locate principal cities on a map of the United States, and if the test does this, it is a valid test. If the test is intended to measure a pupil's ability to think about the problem involved in making a certain city a major port, but asks him only to locate the city on a map, the test is invalid because it measures only an ability to locate. In other words, it is believed that many teacher-made tests and evaluating tools are so invalid as to make a rigid letter grade on them unfair. If the teacher and pupils can devise means of evaluating that measure the desired ends

of learning, the measuring instrument will have validity for the situation. Like a test, the conference and the written report can become valid tools of evaluation.

- A talented teacher attempts to avoid bias by looking objectively at each student in relation to his potentials. He tries at all times to be specific in comments and criticisms, and he helps the student also to find means to be objective. However, subjectivity in evaluation will never be completely eliminated, nor would we want it to be. It is best if both teacher and students understand this fact.

Evaluation in Relation to Critical Thinking

We have said that evaluation is a continuous process; it is not a sudden averaging of marks to a mathematical 79.4 per cent and thus to a C+. In a subtle way the teacher and students are aware that at every step of critical thinking, evaluation occurs. Just the noting by teacher or student of a given youngster's participation and effort is part of evaluation. We turn now to the place in problem solving of the specific aspects of evaluation—testing, records, and conferences.

Testing. In the process of critical thinking, tests may be used at several steps. First, in attempting to arouse anxieties, a good teacher-made or standardized achievement test may provide the student with a picture of present achievement, particularly of his grasp of information. A teacher of some years' experience developed his own readiness test for his high school chemistry class. He studied his subject and listed areas of knowledge in chemistry which his pupils might already know as a result of previous general science courses. He made up questions within these areas and pretested in his classes. He has since refined his test each year until today he has a good instrument to measure readiness for chemistry. He uses this chemistry test to help develop in his pupils a perception of what chemistry can mean to them and of what possible areas of study in the subject they may need to consider. Any teacher can construct his own test to help students to feel a problem in any subject area, or he may use standardized tests for this purpose. The test may be given at the start of new learning. It may be only a simple item or two. For example, a mathematics teacher might place a problem on the chalkboard and ask the class to try to solve it. From their previous learning they would work through part of the

problem and then recognize their lack of certain information or concepts. As they realized the lack, they would be aware of a new problem needing solution.

In a history class the teacher might show a picture of the battlefield at Gettysburg and ask the class to write all they knew about it. They would progress to a certain point, and, like the mathematics class, realize they needed to know far more; again, they would awaken to anxiety.

As a final place for the use of the test in the process of problem solving, we turn to step 5 and forming judgment, where the knowledge gained from solving problems is considered in relation to other learning. Here an end-of-learning test or a unit test may be given. The test results may reveal a need for further study by the entire class, or they may indicate the advisability of some remedial teaching for a few. The purpose of the test is thus not to obtain a grade as a culmination of a unit.

In classrooms where pupils are permitted to progress at their own pace, the test for an entire class may never be given. Proficiency tests would be given when each pupil felt he was ready; and if he revealed weaknesses, he would continue his problem solving until he was ready again. Such a procedure is similar to the administration of driving tests; some people pass them the first time, whereas others may try three or four times before they are permitted to obtain a license.

The talented teacher, then, will test whenever he needs to arouse anxiety, evaluate efficiency in a skill, or conclude his work on a major problem. He may test daily or only once a month. Throughout life young people and adults are faced with tests. We find College Boards, armed forces tests, civil service tests, and many tests conducted by industry for purposes of promotion. Since taking a test is a real-life experience for nearly all people, the talented teacher needs to help pupils to develop skills and abilities to meet it. At the several steps of critical thinking he needs to help them prepare for tests by teaching them to organize material and to write good answers in concise form. He helps pupils to realize, as they learn to understand the process, that taking an examination is not something to fear. When teachers place emphasis on these aspects of testing at steps 1 and 5, instead of upon the grade and standing in class, testing should become for young people an experience in learning.

Records. Testing is not the only instrument for evaluation of progress in problem solving. Students begin to prepare written and oral reports at step 3 (the research and laboratory phase) and complete their records at steps 4 and 5, when findings and conclusions are sorted and considered in respect to other learning. For example, Jesse writes down notes as he engages in research work in United States history at step 3. Later he organizes all his findings into a written or oral report for class use at step 4. His report, not just for a simple list of findings, will include suggestions for further personal investigation or ideas about the use of the findings for future class study. He will keep this report in a folder along with records of his other work.

Rating scales may be used at any stage of problem solving, once anxieties have been aroused. The rating sheet or check list would rate a student's ability to define a problem, the abilities he has used and needed for solving the problem, and also his achievements.

Records of student achievement should be kept by both teacher and students. They will include much that students do at each of the steps of critical thinking. Both records of papers and tests, and records of ratings and check lists, will add to the total evaluation.

Conferences. The pupil-teacher conference, another means of evaluation, is helpful at all phases of problem solving, as the teacher guides individuals at each level of learning. Through the conference the teacher can judge how well Tilly is thinking and where she needs help. Tilly, in turn, has a chance to question the teacher. Together they evaluate Tilly's felt needs, her definition of the problem and way of attack, her research, and her final judgments. The insights gained here by the teacher will be important in the formation of a final evaluation.

Tools for Evaluation

We have discussed tools for evaluation in their general categories. We turn now to the specific aspects of tests, records, and conferences, and to an assessment of their value as tools. Testing must be considered through both standardized and teacher-made tests; reports, through those kept by teachers and by students. Conferences must be studied more specifically.

Standardized Tests. We referred above to Miss D's use of a stand-

ardized test to estimate the pupils' knowledge when they entered her course in September. We turn to these and other standardized tests as they are employed in the classroom. Administrators and guidance workers administer many types of standardized tests to school pupils from the time they enter grade 1 until they graduate from high school. Many schools today make use of readiness tests, achievement tests, aptitude and intelligence tests, personality tests, and interest inventories. The classroom teacher must understand the purposes of such tests and their interpretations. He will be called upon to comprehend pupil ability, progress, and adjustment as they are reported by test results. However, he will not usually administer such tests himself.

For the classroom teacher, the most frequent and useful standardized tests are achievement tests. They cover a wide variety of subject areas taught at the secondary level, such as mathematics, English, history, science, and languages. The teacher should know the major achievement tests in his own area. Teachers may find available achievement tests in their major fields by referring to the catalogues of test publishers whose addresses are listed at the end of the chapter. Specimen sets of tests may be obtained at a very small cost, each one usually including the test, a booklet describing it and how it is administered and scored, answer sheets, and various class-record forms. Teachers will find that nearly all standardized achievement tests can be administered, scored, and interpreted without formal training and test-and-measurement courses. Generally teachers must order these tests on school letterhead paper with the request countersigned by a principal or other administrative officer.

Achievement tests are designed for use before instruction occurs, as in Miss D's class, during instruction at intervals throughout the year, and near or at the conclusion of instruction in June. The achievement test points up a pupil's strengths and weaknesses and often reveals causes of weaknesses. Accompanying charts allow the pupil to plot and thus identify his difficulties in learning. The table of norms provided with most achievement tests offers only limited value to the classroom teacher except insofar as it indicates the relationship of the learning of his individual students in subject-matter content to that of students of comparable training throughout the country.

To use a standardized achievement test in class, the teacher should preview several tests from test publishers and determine whether the

test measures achievement in his area. After he selects the test and obtains enough copies for his class, he will reread the manual of directions provided by the publisher to estimate time for administration, need for special equipment such as carbon pencils, and the way to give directions. He must study also the scoring and interpreting of results to his pupils in order to help them feel anxieties about their learning difficulties. Preferably, he should take the test himself and then score it. A teacher and his pupils may obtain a very good picture of learning growth over a period of time by repeating the same achievement test twice during the year and comparing changes in results. Some tests offer equated forms so that form A may be taken in September and form B in June.

As for other standardized tests, we mentioned the intelligence test as useful but often misleading in its application to teaching. The teacher will find occasion to consider intelligence-test results as a means to compare achievement with potential ability. He should not, however, consider an IQ or percentile score the best indicator of a student's expected performance. If the teacher realizes that a pupil seems capable of better work, he should consult the intelligence-test score. If he discovers that although Maureen's potential is high, she accomplishes just passing work, he might try to follow this problem through with his guidance staff. If he must hold a conference himself, he would say little and try only to discover reasons for poor achievement. He should not reveal an intelligence score except to say, "You have shown a higher ability than your work indicates." Preferably, the talented teacher would watch for and discover individual cases of underachievement and would call upon guidance workers for assistance in leading them to better results.

A teacher may at some time desire to measure a student's potential for the subject matter he is about to study through the use of a special-aptitude test. Music, art, mechanics, typing, and other business subjects offer aptitude tests. There are also aptitude tests in the languages and sciences which measure, in general, verbal and numerical reasoning ability, along with other abilities that contribute to a success. The general-aptitude test is not very different from the intelligence examination and is used primarily in guidance and administrative activities.

The teacher may make use of the information provided by an intelligence test as one means of appraising a student's potential for learning.

The multifactor-intelligence test, providing measurement of verbal, numerical, spatial, and reasoning ability, will help a teacher find one reason for a student's poor or excellent achievement. The teacher, however, must understand thoroughly the meaning of intelligence measurement. He must remember, too, that motivation is a very strong, incalculable factor in learning, and that personal adjustment is another important aid or deterrent to performance.

The classroom teacher also hears frequently about personality-and-interest testing. In most schools he has access to records which include personality-and-interest test results. However, unless a teacher has good training in psychology and counseling, he should not attempt to interpret the scores without help from the guidance department. During the process of learning, a teacher may feel a need to understand the reasons for certain behavioral patterns or the real interests of students. When this need arises, he should seek professional help.

Generally speaking, any standardized measuring instrument which enables pupils to understand themselves and their learning problems helps the classroom teacher and cannot hurt a pupil psychologically. Such tests are achievement tests and, to some extent, special-aptitude tests. In other words, the pupil must know his scores in order to correct difficulties or plan for the future. For a further discussion of the standardized-testing movement, the reader may consult a tests-and-measurement book. A complete list of tests and test publishers will be found in most of these references, and most teachers will find that their schools make available test materials under supervision of the guidance department.

Teacher-made Tests. It is not our intention to give detailed advice about constructing good test questions, although we recognize the value of knowing how to do so. Books on tests and measurement offer lists of suggestions about test construction. Our purpose is to help the teacher decide upon types of tests and upon ways to make testing activities less burdensome.

The teacher often has to choose between an objective test and an essay based on a question or questions. Both will be used in most classes at the secondary level. In this day of science, with its emphasis upon statistics, it is not unusual for a student to wait until he is a college freshman before he takes his first real essay examination. The objective test, especially the multiple-choice type of question, is valuable

as a learning tool when helping young people to perceive their difficulties in understanding facts, information, and certain verbal skills. The pupils correct their own tests. It takes time, however, for a teacher to make a comprehensive list of objective-test items. A 3 by 5 card file of objective-test items under unit or topic headings should alleviate this difficulty, and the teacher may add, delete, or improve items over the years.

Teachers spend altogether too much of their week in constructing tests or in correcting them. There are other ways to save time besides having pupils correct tests and keeping a card file. The teacher in the classroom where cooperation is usual may at times read aloud a good answer to an essay question, hold a class discussion to gather the pupils' ideas, and then, with these thoughts as a guide, ask each pupil to reread his answer and attach his comments. The teacher then needs only to read comments rapidly to discover class growth in understanding. Class members must be trained for such estimation of papers, and with careful preparation, the teacher may expect good results. Teachers also save time by utilizing end-of-chapter questions in textbooks or questions found in reference books and workbooks; such questions generally call for an essay. The teacher will, of course, correct and comment upon most essay examinations.

In the objective questions which he constructs himself, the teacher may gain a rough evaluation of the worth of an item by the number of pupils who get it wrong. If all pupils answer incorrectly or correctly, the item has little value for selectivity. A good item, assuming that through its wording it measures what it is supposed to measure, is one in which about half of the class get it right, the better item being answered correctly by the better student. By this means a teacher can, over a period of years, develop a fairly valid and reliable selection of objective-test items. With such a file, a teacher reduces his time in making up test items each year. These items, however, must be evaluated and checked constantly.

A teacher will use the objective-type examination to measure grasp of basic facts at the anxiety stage; but at steps 4 and 5, where the results of problem solving are summarized and related to personal knowledge, the essay form better helps the student to apply his knowledge to a different sort of problem or to summarize and review it. Both tests have their limitations. The essay test is difficult to score,

and pupils can only partially evaluate their own; furthermore, they often find it difficult to understand their errors on an essay examination. The objective test encourages memorization as an aim in learning. The essay test covers only a limited amount of course content, whereas the objective test can be rather inclusive of the course material in terms of specific information. The scoring of the essay test involves a subjective judgment on the part of the teacher, but the objective test is subjective in the selection of items. All forms of evaluation involve some subjective judgments, and although both kinds can promote thinking, many students and teachers feel that the essay test promotes more critical thought. Both types are valuable tools according to the purpose of their administration. For both kinds of tests, finally, part of the teacher's role is to help students to outline and plan an essay answer so that it will answer the question asked, and to go quickly through the items on an objective test in order to have time to return later to those which are unfamiliar.

Teacher Records. We have already mentioned that many teachers become engrossed in keeping records of learning progress. They place A's and F's in their grade books each day for each pupil based on a recitation or quiz. In percentile figures they record test grades. At the end of the term a pupil's grade is determined by an arithmetic average of record-book entries. Let us consider ways to improve this process.

The talented teacher realizes that learning cannot be measured with symbols such as A or 98. The results of problem solving can be evaluated only when each pupil and his teacher can weigh all possible criteria and arrive at an agreeable evaluation of growth. Daily entries of classwork, test scores, and other learning results must be compiled by each pupil to assess daily or weekly progress. A test score is not essential. The important result of the test is an evaluation by the pupil and his teacher of the mistakes made and the corrective steps needed to solve the problem of a special weakness. It is these corrective measures, spelled out, that the teacher needs to keep in his records.

It is suggested, therefore, that every talented teacher devise a simple form for listing in a few words the strengths and weaknesses of his pupils in the various aspects of learning. The teacher might duplicate on 8½ by 11 paper a reporting or recording form, with the student's name and class at the top and a column at the left side for the date. (See Chart 2.) The comments might read as follows: "September

NAME _____	CLASS _____
DATE	Observational Notes
9/22	<i>Theme not well organized and spelling poor; evidence of little thought to work.</i>
9/29	<i>Made many errors in spelling on quiz but did well on grammar. Confused "i" before "e" concept.</i>

CHART 2. Sample Student-evaluation Sheet for Teacher

twenty-second—Theme not well organized and spelling poor; evidence of little thought given to work. September twenty-fourth—Didn't do any homework. September twenty-fifth—Gave an excellent account of his book report; obviously enjoyed Zane Grey novel. September twenty-eighth—Carried on a good discussion with classmates on value of knowing how to write a personal letter; he had read well on the "how-to" of personal writing. September twenty-ninth—Made many errors in spelling on quiz but did well on grammar."

Teachers may argue, "This is too time-consuming, and there are no grades listed." Perhaps in the long run no more time will be taken with this process than with recording grades. All a teacher needs is a clip board with his class's individual record sheets arranged in alphabetical order. In essence we have here an illustration of the anecdotal record form, which has not received the prominence it deserves in evaluation. It tells much more of individual progress than does a row of numbers or letters.

Let us examine in more detail the type and frequency of entries a teacher might make on this form. Certainly in most courses an entry for each day is not necessary. Entries may be recorded as the teacher walks about the room observing work habits at various steps of critical thinking. He might desire to note days on which the student is absent. Instead of writing an 80 for a test—a figure which says only that the student scored 8 out of 10 or 80 out of 100 correct answers—the teacher records that the pupil did better than average on the test but made two mistakes: he "failed to remove a parenthesis around his answer; missed a negative sign at the second step of the question." This tells much of value, for if these same mistakes appear in future entries, the teacher and student then become aware of an area of misunderstanding.

Since the student will enter assignments on his own daily evaluations, it seems wasteful for the teacher also to do so. Briefs of comments placed on written and oral reports are a desirable type of entry, for again the teacher may perceive trends. Also, comments on social and emotional attitudes to thinking seem desirable. If Peter is very negative in his feelings toward a learning problem, a note would help the teacher to learn whether his resistance persists as learning progresses. In other words, classroom behavior that pertains to growth of his pupil will be entered in the teacher's record. He will develop a shorthand to

simplify his entries, and his records should become as much a part of his teaching role as his planning and execution of problem solving. At marking periods the teacher and his students may sit down together and read the anecdotes to discover signs of improvement over a period of time. No other evaluative records are needed by the teacher, because this record sheet is flexible enough to encompass all possible actions and reactions of the pupil.

Pupil Records. Secondary school students are capable of keeping their own records of progress and should be encouraged to develop a sense of personal evaluation as they proceed through the steps of learning. The teacher should discuss evaluation with his class during the first week or two of the year, helping pupils to understand that he intends to give them responsibility for assessing their growth in learning. First of all, he should tell students about the type of records he will keep for each of them and then ask the class for suggestions of ways to record other evidences of growth.

Undoubtedly the pupils will suggest a need to keep account of test results, outside assignments, and any other written work whether in or out of class. The talented teacher, thinking of social and emotional growth as well as of factual learning, may suggest ways of judging each student's role as a member of the class or group and his individual feelings. Students and teacher might develop a check list or rating scale to be completed by the student each day just before the end of class.

Students, thinking as they do in terms of quantity, may desire to keep all of their visible evidences of growth in a folder or envelope. In a class in English every student placed each new theme or written book report in his folder, which was passed to the teacher along with all of his previous work. This filing system permitted the teacher to see changes as they occurred from one time to another. Probably the student will find it unnecessary to keep homework papers in the folder, but examinations and summaries of problem solving will help him in review and in other ways. Such a filing plan enables students to build one experience on another and to look back to written work done previously before writing new material.

The student should also be encouraged to keep anecdotal records similar in form to teacher records. In these anecdotes he might be encouraged to express his feelings about various aspects of the course or about his own levels of academic achievement in and out of class. He

might also be asked to enter comments about his personal and social growth in the classroom. He could list his errors on quizzes and major examinations.

To be more specific, let us follow student records in an algebra class. The teacher and students discuss cooperative evaluation during the first week of school, and the teacher explains his views on marks.

"Grades on a test really tell us little. Therefore, I feel it would be better not to place a grade on your papers but instead to record where you make errors, note what you did wrong, and suggest how we can correct errors. I shall read some of your examinations and papers, but in most instances I want you to correct your own. I want to keep a record of your work habits and a record of your accomplishments, but I plan to do so only by writing a comment on this form." He shows the class his anecdotal forms for each pupil. "Would you like to keep an account similar to mine?" Then he asks, "Now in our algebra class, what should each of you expect to learn and how can you check to see if you have learned?"

The members of the class mention skills in handling equations and word problems, graphs, charts. They discuss efficiency in work habits and real understanding of new algebraic situations. For approach, they mention homework and board and seat work in class. (Anxieties are being stirred up, and the class is now defining specific problems and how to handle them.) The class mentions a daily quiz as a means of measuring their understanding.

Again the teacher guides, "You have discussed homework, class-work, and quizzes as ways for you to learn algebra. Could we develop a means of recording your progress in these three areas, say perhaps a daily check list? Perhaps we could combine this check list with the anecdotal form which I plan to use. Let's see what we can do." With some help from the teacher, the class proposes and develops the idea of a "daily log sheet."

The teacher agrees to have the forms of the sheet mimeographed for the class. On each would appear three categories of work, with various comments beside each category, e.g., "Category 1—Homework and quizzes: all correct, few careless errors, did little because of outside reasons, because of lack of understanding; Category 2—Board and seat work: liked work today, participated well, didn't participate, lacked interest, lacked understanding; Category 3—Approach: worked effi-

NAME _____		CLASS _____		WEEK of <u>9-25</u>			
DATE		Good understanding or participation		Average understanding or participation		Little understanding or participation	
		Home work	Class work	Home work	Class work	Home work	Class work
9/25	M		✓			✓	
9/26	T	✓	✓				
9/27	W	✓	✓				
9/28	Th		✓	✓			
9/29	F	✓					✓
My Reactions							
9/25	Didn't do H.W. but liked our class discussion and feel I see my way clear for H.W. tonight.						
9/26	My oral report went well. My H.W. helped me to answer questions asked by classmates.						
9/27	Made only one error on review quiz. I still get confused on converting English to metric measures.						
9/28	I wasn't interested in class today because I fail to see much of value in what we did.						
9/29	I didn't feel like taking part in class discussion because it was too elementary.						
General Grade Evaluation for Week							
9/29	I feel I did about B-level work this week						

CHART 3. Sample Self-evaluation Sheet for Student

ciently and well, worked fairly well but approach needs improvement, approach poor." The student would check one comment in each category. Added would be at least one freely written comment each day, such as, "I didn't get into the discussion as much as I should have," or, "Wish we could do more of these problems," or, "I never will understand curves and their equations but I'll keep trying."

The class decides to try out this daily log sheet for the first quarter. It will be the student's duty to make daily entries in class. He will keep these in his personal folder along with his various tests and papers (other than homework). Thus the algebra class enters an experience of self- and cooperative evaluation. At the end of the quarter, while the members of the class are working at their seats, the teacher talks to each pupil individually; they compare records and arrive at a grade which is, as far as possible, mutually acceptable.

The form of record keeping is flexible and will vary with different subjects. Some teachers may prefer that their students think about separate forms for each learning activity. In this way the student might keep a more detailed account than we have indicated for homework, quiz and test results, and class participation. It is important that students be encouraged to write also a brief subjective anecdote daily on their reactions to the class activities in learning. At time of grading, each student should add to his folder a summary evaluation of his progress in critical thinking.

By the means explained for teacher-and-pupil records, the teacher will spend little out-of-class time on his professional responsibilities for evaluation, except in thinking about the kinds of learning and achievement which should be evaluated. Evaluation will then not consist in using a slide rule to measure student achievement and progress.

Although no educational measuring instrument is completely reliable or valid, the closer the teacher and student work together, the higher will be the reliability of the rating forms. The teacher can help his student become aware of errors in his self-evaluation, and the student can often show the teacher a misconception. Reliability will increase with use. The greater the number of experiences with the other person's assessment of his evaluation, the greater will be the consistency of approach.

Conferences. At any time during problem solving, whenever there is an opportunity, teachers may speak individually with students in an

attempt to aid them in self-evaluation. Such questions as the following would be helpful in the conference: "How well do you feel you are doing?" "How far has your understanding progressed?" "Do you feel you know more about how to tackle problems?" "Is anything special still bothering you?" With these questions, the teacher establishes an atmosphere in which the student can work on his own self-estimate. Training in counseling is invaluable for a teacher who wants to establish successful conferences. Strang writes that the most important feature of a conference "is a dynamic face-to-face relationship in which the counsellee is helped to develop insights that lead to self-realization."⁴ The ways for effecting such results should be studied in detail.

As time for grading approaches, the student writes an evaluation of work to date and passes it to the teacher. Armed with all of the student's records plus this evaluation and his own records also, the teacher arranges a conference with each student. These conferences should necessarily be short, probably covering not more than two class periods for all class members. A good conference presupposes complete honesty on the part of the teacher. He does not say, "I want you to decide your grade," and then proceed to force the student to accept the grade already predetermined. Planning of the conference might be done with the whole class. "We are going to hold individual conferences to determine the grades to be sent home and to iron out any disagreements on that grade as best we can. You can tell me where you think I have estimated inaccurately and I shall do the same with you." Thus the teacher and student sit down together and talk over the final evaluation each has arrived at. The teacher should explain what he thinks are the student's needs and weaknesses, and should listen while the student does the same. Then he should explain why he feels the student's grade of himself is justified or not.

If there is evidence of unhappiness, lack of ability in self-evaluation, hostility toward the evaluation or the teacher, the student should be referred to the guidance department for counseling. However, if student and teacher cannot arrive at agreement, the teacher may be forced to say, "I am afraid we just cannot agree. Since I must send the grade to the office, I feel I must give you a C. I respect your ideas and I realize that you may be right and I may be wrong." Here the purpose

⁴ Ruth Strang, *Counseling Technics in College and Secondary School*, Harper & Brothers, New York, 1949, p. 100.

of grading must be distinguished from that of evaluation. Grading is partly a teacher's responsibility to the administration, and thus a grade must be his estimate and not the student's. If the teacher disapproves of grading, he must work through administrative committees to alter policy.

If possible, the teacher should revise his estimate wherever evidence presented by the student warrants it. The best conferences grow out of the teacher's desire to learn about the student and his sincere respect for the boy's or girl's ideas.

Reporting Grades

In spite of the fact that an A or an F alone tells little, to parent or student personnel worker or future employer, most students today are graded by either the alphabetical or numerical system. Some schools supplement this mark with a second symbol to represent effort and attitude. With little additional work, the teacher can reconcile a desire to report all progress to parents and others while conforming to an A, B, C grading system. Let us consider how Mr. F solved this problem in his senior English class.

During the first week of class in September, Mr. F presented the topic of grades and evaluation to his students, suggesting that at the end of the marking period, through their records and folders they might evaluate themselves and also determine a tentative letter grade which they believed they deserved. They defined their problem, "How can we evaluate ourselves and help the teacher arrive at a fair grade?" Next they determined the bases for keeping records of themselves (second part of step 2). Mr. F and his class talked about many ideas, deciding upon the following: a record of outside reading, such as books, plays, and poems, which would include not only the amount read but also personal evaluations of each piece of literature; a record of themes and reports written, including student and teacher comments; a daily record of class contributions, such as helping the class solve a problem; a record of homework, including a note each day on quality; and finally a place to record test results. In addition, space was left for a freely written comment each day. At the end of each quarter, each student rated himself in a written or essay form. The outline for the written report included competence in skills and accuracy in matters

of fact as revealed by achievement tests; proficiency in written and oral reports based on teacher, class, and personal evaluations; contributions as a member of the group—an estimate which would depend upon whether one participated in discussions frequently, occasionally, seldom, or never; and an account of outside reading based on the quantity, quality, and scope of selections in different life areas. The student then added his grade of A to F, passing all records and evaluations to the teacher.

Mr. F read the reports, added comments such as, "I think you've underestimated yourself on quality of reading," or "I feel you have been very objective to yourself in your over-all rating," or, "Don't you think your rating on writing ability is high, considering your mistakes in spelling and punctuation?" Thus he was ready for his conference with each student.

After the conference, the grade decided upon was sent to the office and then home in the same form which has been in vogue for years. Mr. F requested that in addition the student take home his daily records and evaluations with Mr. F's comments attached. Through such an approach to evaluation, Mr. F conformed to the single grading system but provided parents with additional information without adding to his own paper work.

The talented teacher, then, utilizes standardized and teacher-made tests. He adds pupil records and his own evaluations based on observations, performances, and growth in thinking, and from the composite record arrives at a letter or numerical grade that is usually accepted by the pupil after a conference. The pupil defines his part in evaluation, proceeding through problem solving to a conclusion. He learns thus to appraise his own growth. Mutual planning and sharing lead to cooperation in evaluation. No longer is the student faced with sudden elation or dejection as he receives his report card from his homeroom teacher. No longer can he shrug off the teacher's grade as none of his responsibility.

* * *

Evaluation is not a necessary evil in teaching; the talented teacher views it as part of teaching-learning which offers real, lasting value to the learner. "Evaluation by the pupils of the procedures and the results of their work can be made a valuable learning experience."⁵

⁵ Mills and Douglass, *Teaching in High School*, p. 196.

Through studies in the fields of psychology and educational psychology, the meaning of the term evaluation has expanded. In many ways evaluation is a bright, new concept. Few philosophers and writers of the past give it attention. Today it must be viewed as a total process composed of many parts.

In evaluating his work, the teacher will utilize the means for offering his students an estimate of himself; and by noting trends—the number of students who do well on tests, the number who arrive at judgments, the quality of the judgments, and in a limited way their comparison with other students through national norms—he will have suggestions for his own personal estimate of his teaching.

If the reader's evaluation of the process of evaluation presented here is to consider it useless, he must then work to develop a system of his own. We suggest only that he remember to aim as consistently for thinking in the field of evaluation as elsewhere.

LEARNING MATERIALS

Some Cases

1. A beginning teacher was shocked that all but one of her eighth graders failed her first social studies test. How might this situation be revised? Is she a poor teacher? A poor tester? Or does the evidence prove anything?

2. The first student said, "I got an A so I am better than everyone else in the class except those who got A's."

The second student said, "I got a C which is bad but I tried as hard as I could."

The third student said, "I got an A but I just memorized and now I've forgotten it all. I didn't learn anything."

The fourth student said, "I got a B so my grandmother will give me \$10."

What are the ideas in students' minds as they read a grade, and why do grades create such controversy?

3. The first teacher said, "I'm glad I teach math. Here is a student's paper—five problems all wrong equals zero. There's no difficulty with evaluation here."

The second teacher said, "I should have given 90 per cent credit for every one of those algebra problems, because the student understands the process but was just careless."

The third teacher said, "You have chosen only two kinds of problems here, so he may know lots of other things. A zero is unfair."

What kind of marking might be shown the first teacher to help him to grade with more accuracy as well as for more value to students?

4. The teacher said, "I use every device known for evaluating students. In this way I gain insight into my teaching as well as into their learning. But I think the most important thing is that they use the evaluative devices themselves to make a self-appraisal."

Why does this teacher approach fulfill the aims of good teaching as well as of good evaluation?

5. The teacher said, "I worked and worked getting the students to carry through in solving a problem they defined—'What makes a good book?' Now that we are finishing up on the problem, I just don't know how much they have learned. They have learned so many different things that evaluation seems hopeless." How might this teacher be helped to understand the purpose of evaluation?

Some Controversial Thoughts

1. Among other reasons, evaluation is used by teachers to diagnose weaknesses and strengths and to help students overcome them, to give information to teachers for working with students, and to understand student problems.⁶

2. "Too often the overemphasis on the one correct answer encourages lazy thinking, cheating, and merely mechanical manipulation of arbitrary and meaningless symbols."⁷

3. During middle and later adolescence capacity for self-evaluation becomes highly developed.⁸

4. "The use of evaluation procedures to disclose instructional weaknesses has proved to be one of the most valuable ways by which to improve teaching effectiveness."⁹

5. Marking is essential. However, "the difficulties, evils, abuses, and limitations of marking systems have brought the suggestion that all marks be abolished."¹⁰

6. "If a teacher is to do an adequate job of evaluating student growth, he should attempt to measure growth toward all major goals of the instructional program."¹¹

⁶ Schwartz and Tiedeman, *Evaluating Student Progress in the Secondary School*, p. 11.

⁷ Jean D. Grambs and William J. Iverson, *Modern Methods in Secondary Education*, The Dryden Press, Inc., New York, 1952, p. 381.

⁸ Lindley J. Stiles and Mattie F. Dorsey, *Democratic Teaching in Secondary Schools*, J. B. Lippincott Company, Philadelphia, 1950, p. 212.

⁹ Nelson L. Bossing, *Teaching in Secondary Schools*, Houghton Mifflin Company, Boston, 1952, p. 247.

¹⁰ M. L. Goetting, *Teaching in the Secondary School*, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1930, p. 205.

¹¹ Georgia S. Adams and Theodore L. Torgerson, *Measurement and Evaluation: For the Secondary School Teacher*, The Dryden Press, Inc., New York, 1956, p. 17.

7. Nowadays we try to evaluate by getting evidence on "the heretofore intangible outcomes." And now we care more that the pupil understand his learning than that he remember it.¹²

Suggestions for Further Reading

1. Buros, O. K. (ed.): *The Fifth Mental Measurements Yearbook*, Gryphon Press, Highland Park, N.J., 1959. Lists all major standardized tests with complete information about them.
2. Greene, Harry A., and others: *Measurement and Evaluation in the Secondary School*, Longmans, Green & Co., Inc., New York, 1954. Especially helpful in Chapters 6 and 7 on construction of tests.
3. Noll, Victor H.: *Introduction to Educational Measurement*, Houghton Mifflin Company, Boston, 1957. A complete introductory book with statistics clearly presented for the nonmathematician.
4. Remmers, H. H., and N. L. Gage: *Educational Measurement and Evaluation*, Harper & Brothers, New York, 1955. Complete coverage, including achievement, abilities, adjustment, attitudes.
5. Ross, C. C., and Julian E. Stanley: *Measurement in Today's Schools*, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1954. Part II on the teacher-made test is especially helpful.

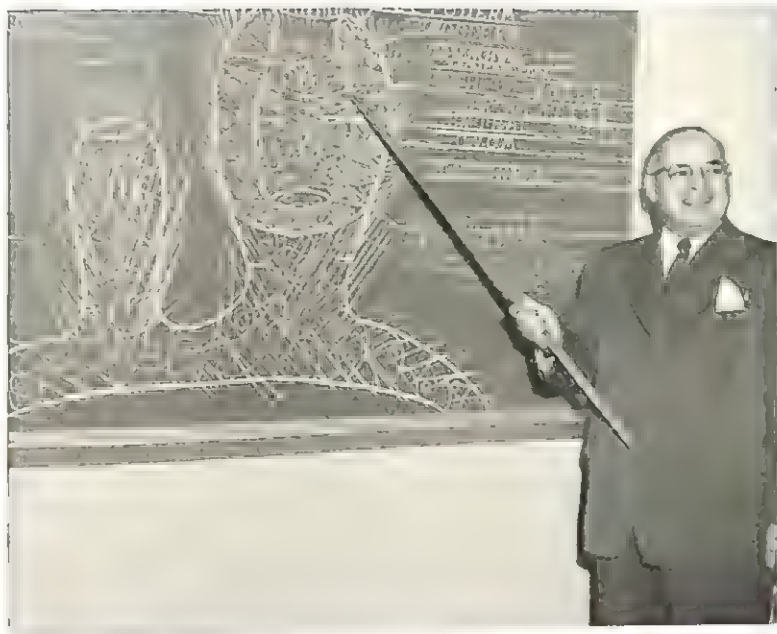
Some Major Test Publishers

Catalogues of published tests may be obtained by writing to the addresses below.

1. California Test Bureau, 5916 Hollywood Boulevard, Los Angeles 28, Calif.
2. Educational Testing Service, 20 Nassau Street, Princeton, N.J.
3. Houghton Mifflin Company, 2 Park Street, Boston 7, Mass.
4. The Psychological Association, 304 East 45th Street, New York 17, N.Y.
5. Science Research Associates, Inc., 57 West Grand Avenue, Chicago 10, Ill.
6. World Book Company, Yonkers, N.Y.

¹² Raleigh Schorling and Howard T. Batchelder, *Student Teaching in Secondary Schools*, McGraw-Hill Book Company, Inc., New York, 1956, p. 297.

PART FIVE



15

The Teacher

Any consideration of a method of teaching properly devotes some time to the teacher. Around his personality, his relation to his profession, his foibles and mistakes, the method moves. "A teacher affects eternity," as Henry Adams wrote; "he can never tell where his influence stops."¹ Let us realize, then, that teaching-learning changes individuals. A talented teacher stops at least once in a busy day and says to himself, "I might think of what I am doing here. I stand in front of this class with the declared purpose of altering the lives of other people. My purpose and duty is to bring about such changes. This is a great responsibility." For this reason we turn to consider the teacher, first as an individual, then in relation to his profession, and finally as a fallible human being who makes mistakes.

¹ Henry Brooks Adams, *The Education of Henry Adams*, Houghton Mifflin Company, Boston, 1918, p. 300.

You

Although some teachers attempt to accomplish the feat, it is impossible for an individual to divorce himself from his act of teaching. You are a person with your own needs which must be met in life's problem areas. All that you might learn about teaching method could be lost to you if you failed to relate your learning to yourself, if you did not, in other words, understand what you had learned but merely remembered some other person's ideas. In order that those ideas may become learning, as we have said, they must interest you, and then you must follow through in thinking about them to the final step of problem solving and judgment. A direct examination of a method of teaching as it relates to you becomes imperative, therefore, in order to ascertain that your hypotheses about method mesh with your real self.

We have not discussed the matter of the appropriateness of certain technics to certain kinds of personalities because there seems to be no justification for the assumption that a teacher's personality can dictate his technic. On the other hand, we have assumed the necessity for a cooperative atmosphere in the classroom, and thus the person who will teach critical thinking must be able to function in such an atmosphere.

Someone may ask why we do not merely list a group of traits which a teacher ought to have. According to psychological research, such an approach would be useless. Shaffer says, "*The personality traits of the individual are his persistent habits toward making certain kinds of adjustments rather than other kinds.*"² Furthermore, Allport's extensive study of personality shows that no two persons have the same traits, and in addition, the special conditions of the moment demand an adaptive response, "perhaps never again required in precisely the same way."³ Mills sums up this idea when he says, "The fact remains that the personal characteristics of effective teachers vary greatly with the individual and are influenced by the school and the community in which the teachers work."⁴

² Laurance F. Shaffer, *The Psychology of Adjustment*, Houghton Mifflin Company, Boston, 1936, p. 132.

³ Gordon W. Allport, *Personality*, Henry Holt and Company, Inc., New York, 1937, p. 313.

⁴ Hubert H. Mills and Harl R. Douglass, *Teaching in High School*, The Ronald Press Company, New York, 1957, p. 39.

Therefore we suggest, in the form of questions, several broad categories of personality, and ask you to relate yourself to them. Our intention is only to aid you to think about yourself and your values. Further suggestions for appraisal are offered at the end of the chapter. As a first step you may need to realize that "it is the richness and depth of the inner life of the teacher and the qualities he holds as a man of character and commitment that determine his students' response to his teaching."⁵

We list below several sets of questions. Mark the proper response before reading the section which follows. Be honest with yourself. Since some answers are obvious, truthfulness will be your best check. At the end of the section, our answers are listed. In other words, we suggest that you answer the questions, read the section, then check your answers and ask yourself about those which differ from the key. We make no claim that our answers are either right or wrong. Our purpose in using questions is merely to arouse your anxiety. If you question the validity of our key, we suggest only that you ask yourself why you do so.

The Individual. Please answer the following questions either Yes or No:

1. a. Do you forget yourself when you are busy helping others?
b. Do your troubles loom large so that you keep thinking of them?
2. a. Can you name your basic beliefs?
b. Are they woven together so that they do not contradict one another?
3. Do you try to make others aware of your accomplishments?
4. Do you often laugh at yourself, saying, "What difference will it all make one hundred years from now?"
5. a. Can you name your strengths and weaknesses?
b. Do you admit and use your basic desires of love, security, belonging, success, and opportunity to love?
6. Do you want very much to be a mature individual?
7. Do you feel that there is little relationship between your self and your method of teaching?

⁵Harold Taylor, "The Teacher at His Best," *The Two Ends of the Log*, Russell M. Cooper (ed.), University of Minnesota Press, Minneapolis, 1958, p. 162.

8. *a.* Do you often have a feeling of not being right as a result of your actions?
- b.* Do you have a feeling that it is right for you to teach?
9. *a.* Can you state what you value most?
- b.* Do you know which of your values you would try to influence others to accept?
10. *a.* Do you know how highly you rate your self?
- b.* Every other self?

It is obvious that a first step in a look at you must mean "know thyself." What kind of person are you? Do the hypotheses upon which you act fit your kind of personality? How can you adapt them so as to use your personality plus your knowledge of teaching method and subject in a combination which will make you a good teacher? Walter Lippmann wrote, "For unless a man has acquired the character of an adult, he is a lost soul no matter how good his technical equipment."⁶ A mature individual, who sees himself as a worthwhile person, can set himself to the task of offering to young people the kind of help and attention which will lead them toward maturity. A worried, unhappy, frustrated, neurotic individual, one whose personal needs are so great that he must foster them above all else, even above the needs of his students, cannot lead young people through the steps of thinking. Part of maturity implies understanding your basic desires and accepting the fact that you, as well as your students, need love and security.

Allport says that maturity is divided into three parts: "extension of self," which involves ability to participate in one's activities wholeheartedly—the activities being directed not toward immediate goals and self-justification but toward socialized and culturally compatible ends; "self-objectification," which involves self-understanding with insight and sense of humor; and "a unifying philosophy of life."⁷ No one presents in himself a completely consistent picture of maturity. Yet, if you know yourself and your strengths and weaknesses, and hold in your mind an image of the mature individual you want to be, you will be better able to teach because you will handle with sureness the

⁶ Walter Lippmann, *A Preface to Morals*, The Macmillan Company, New York, 1929, p. 184.

⁷ Allport, *op. cit.*, pp. 213–214.

method you honestly believe in. Religion will help you; so too will philosophy, psychology, and education, provided all of them are woven together into a totality which you can grasp.

This takes us back to Socrates, who said, "The unexamined life is not worthy to be lived by man." Good teaching comes from the examined life, the life in which religion and psychology, learning about life and people, and learning about method of teachings are all carefully considered and are within an understood pattern which feels right and good to the individual. An examined life is never completely understood; but emphasis upon examination of one's beliefs will help to produce a workable kind of consideration of oneself. Your own life experiences, like those of all human beings, are undoubtedly largely haphazard; but the man who stops to consider his strongest beliefs and the ideas and concepts which he values most will be a better teacher than the unreflective man. He will know himself and his values; he can emphasize them proudly because he believes their worth. He also realizes the vast importance of helping his students, in turn, to examine their lives.

You have only one self. It is you. Surely it is as worthy of your consideration as any other area of study. "Whatever it be, this entity, this I, this being that cares for truth and beauty, the haughty exclusive, conscious soul, its sense of personal identity survives all assaults."⁸ One needs to emphasize this sense of himself or of his self. As he realizes his own identity and its worth, he can more easily help students to discover an identity which they, too, can hold worthy. The teacher who has little sense of himself, who has never considered the philosopher's conclusion, *Cogito, ergo sum*, will find that the necessary respect for the identity of other individuals will not come easily.

You, the individual, then, cannot expect to be a talented teacher unless you look upon yourself as a worthy and mature individual with beliefs which you understand. With these as a basis, not in perfect form but in the process of being considered, you will be able to consider method and, understanding it, make it a part of this *you*.

(Answers for *The Individual*: Yes—1a, 2a, 2b, 4, 5a, 5b, 6, 8b, 9a, 9b, 10a, 10b; No—1b, 3, 7, 8a.)

⁸ W. MacNeile Dixon, *The Human Situation*, Edward Arnold & Co., London, 1938, p. 384.

Faith. Please answer the following questions either Yes or No:

1. Because Tommy is slow, do you make judgments about him?
2. a. Do you feel you have little faith in what your students may become?
b. In the changes you may effect in them?
3. As you look at another, do you often think in terms of whatever is in him that may be improved?
4. Do you have in your mind the answers students must arrive at? If you have, are you ready to accept the fact that logically this mind-set limits students' creativity and potentialities?
5. Do you have faith that the process of critical thinking will bring about real changes in students?
6. Do you know what effect lack of faith in improvement will have upon students?

His hours are long; his charges are noisy and often troublesome; his work is never done; he must utilize the process again and again while students flounder in the same kinds of mistakes. Thus the teacher views his work. In class Tommy is slow and uninterested and inattentive. Is he an Edison? Win is methodical and careless and dull. Is he a Churchill? Here are his students.

"One thought you must always hold is that you can attain a higher level for your life. Few people realize their real possibilities. Many believe that 'ordinary' persons must remain ordinary all their lives. That concept is false and a slander on human nature and on the God who created you."⁹ Such faith in the power of improvement of human beings is necessary for you, both for yourself and for others. Better that the talented teacher should have too much faith in his own and his students' possibilities for improvement than too little! What do we know of a man's potentialities? How horrible to squelch any what-might-have-been! You and your faith will effect tremendous changes. If you can inspire yourself and others to levels which they never dreamed possible of attainment, you are indeed a talented teacher. If you are certain at the outset that Tommy and Win will "never get anywhere," what chance have they?

Denison says, "It is perfectly possible to create almost any change

⁹ Norman Vincent Peale, *Stay Alive All Your Life*, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1957, p. 9.

in personality.”¹⁰ How many times the evidence gathered about a great change in a human life indicates that “someone believed in me.” Too often teachers see evidence that Tommy is slow, and thereafter Tommy might as well wear a sign reading, “I am slow,” and in even bigger letters, “I shall always be slow.”

Your subtle relationships with the students will make them aware immediately of the amount of faith you have in them, in their ability to improve and change. Students can and do accomplish extraordinary things; they can undergo dramatic changes for the better. If your assumption, however subconscious, is, “I know the answers, and this answer is what the students must arrive at,” you have already tagged and labeled their potentialities for creativeness and accomplishment. But if you have faith that, given the opportunity, change will occur and that students will think as they never expected they could, then the subtle difference in your attitude will produce this very result. As in religion, the essential requirement is faith that it will happen.

If you expect to help students to engage in thinking that will result in judgment, you must have faith in both process and students. If this faith is lacking, no amount of study of method will make you a talented teacher. The real you, the person that you are, must believe. Your basic faith is the student’s hope—the vision in both of you which inspires him to prove to you that you are right, that your faith is well founded. If you do not believe that students have the ability to use problem solving to find hypotheses and judgments which are creative, then you will stand in the way of the success of the method.

(Answers for *Faith*: Yes—3, 5, 6; No—1, 2a, 2b, 4.)

Feeling with Others. Please answer the following questions either Yes or No:

1. Have you ever felt as though you were inside someone else, seeing things through his eyes and heart?
2. In your conversation, do you tag people with labels?
3. Do you know what effect such labels will have on your dealings with those people?
4. Can you name the advantage in seeing things as a student sees them?

¹⁰ J. H. Denison, *The Enlargement of Personality*, Charles Scribner’s Sons, New York, 1930, p. 205.

5. Can you take someone you know, and starting with the phrase, "He feels that—" add a large number of his probable emotional reactions to his experiences?

"Which of us has known his brother? Which of us has looked into his father's heart? Which of us has not remained forever prison-pent? Which of us is not forever a stranger and alone?"¹¹ The talented teacher, Thomas Wolfe notwithstanding, must look into his students' hearts. He must learn to feel with them, to understand what they are thinking and feeling as though he were inside them, as though he were seeing through their eyes and their hearts. Mr. T speaks with lots of sarcasm in his classes, and claims that he motivates his students thus. But Mr. T has not stopped to look through the eyes and heart of Nancy. Nancy feels as though she would like to shut her eyes and be someone else every time Mr. T says in a sarcastic tone, "You tried, Nancy. You always just miss the boat, don't you?" Nancy feels hurt and bewildered and afraid; she does not improve; she is too unhappy to be motivated to learn. If Mr. T could place himself in the eyes and heart and feelings of Nancy, his approach to her would undoubtedly alter immediately. You must get inside your students. It is not difficult with practice if one thinks always in terms of, "How is he feeling? What thoughts is he thinking?"

We suspect that in our culture you have not learned to feel with others. We say, "Johnny is intolerant; Mabel is too soft; Grady is radical; Rob is a tattletale." We attach labels to people, generalized labels which are often inaccurate and which cannot summarize a whole individual. We are told that in other cultures feeling with others is part of learning. "To know how a person feels was to my Chinese friends more important than anything else about him, for until one knows how another feels no friendship can be established nor even business carried on with mutual benefit."¹²

Do you know how to feel with others thus? If you can feel with your students, you will know when they need help, when they are unhappy over an outside occurrence and cannot learn, when they feel lost or behind the group, when they feel inspired and curious. Then you can assist each of them to move forward to his best advantage toward

¹¹ Thomas Wolfe, *Look Homeward Angel*, Charles Scribner's Sons, New York, 1929, Foreword.

¹² Pearl S. Buck, *My Several Worlds*, The John Day Company, Inc., New York, 1954, p. 370.

learning through problem solving. If you have tagged and labeled certain students as rebellious, or aggressive, or passive, or dull, you cannot discover what they need, and thus, though you may offer to help them, you may lead in a wrong direction.

Learning to feel with others is a matter of concentrated practice. Every time someone speaks, try to phrase his feelings beginning with, "He feels that. . . ." Be specific and do not generalize as labels do. "He feels that he wants to know more." "He feels that he will never learn as fast as the others." "He feels that his trouble at home is so great that he can't concentrate." Your students will soon be aware that you feel with them, that you understand how they feel. Though you may be tempted to say, "Harold is brilliant," Harold may feel, "I know that I am stupid." Though you may say, attaching a label, "Carolyn is naughty," Carolyn may feel, "I just wish I knew how I ought to act." The difference is obvious, for seeing him as he sees himself, that is, feeling with him, you may then be close to him and help him. This attitude, in addition to faith in their potentialities, should afford students the kind of confidence necessary to tackle big problems and to think about them in a creative way.

(Answers for *Feeling with Others*: Yes—1, 3, 4, 5; No—2.)

Responsibility. Please answer the following questions either Yes or No:

1. Do you feel certain that you know what is your greatest responsibility in the classroom?
2. Do you enjoy having a position of authority?
3. Would you use your authority as a form of coercion, saying, "Carl, if you don't pay attention, you will have to come back after school?"
4. Can you teach in a position where you do not exercise such authority?
5. Could you be happy if you never imposed your ideas on others?
6. Must you have reassurance of your success by having students do what you tell them?
7. a. Do you think students should show "respect" toward the teacher?
b. Or would you feel that any respect you have from students would have to be earned by your own actions?
8. Could you justify your failure with some students?

The responsibility of the talented teacher is to teach. This may seem an absurd statement, but it is far from simple. We have defined one vital aspect of teaching-learning to be insistence that students arrive at their own hypotheses and judgments. But you may need to look deeply within to discover if such a path will be difficult for the kind of person you are.

You stand in a new classroom and thirty-two heads line up before you. You may say to yourself, "Ah, at last I have arrived. These students must do as I say. I hold the reins. They know that if they do not act as I tell them, I can fail them or send them to the principal. I am the authority. I am in control." As you read these words, you may find them absurd. But examine your own self. How much do you enjoy playing the role of authority? How often would you exercise this authority, even if subtly? Would you say, "You will have to get that report in, Bob, or I'll be forced to give you a zero?" or, "If you insist on that behavior, Matt, I'll have no recourse other than the principal's office." In other words, kindly and softly, do you cover up what amounts to, "You do as I say or else"? How much enjoyment do you gain from such a position? Could you afford to put yourself into the kind of situation in the classroom where this authority would be jeopardized? Could you imagine yourself teaching without it?

We have already noted the effect of teacher control on classroom discipline. Now let us look back to the description of teaching by the talented teacher, the coalescence of adolescent needs with teacher aim for thinking. Cooperation, to a large degree, removes the teacher from the position of authority. But if you are the kind of person who needs to find self-esteem through being the authority, you will with difficulty become a talented teacher. Cantor writes, "We want to impose our ideas on others,"¹³ and in another place, "Teachers, too, wish to control pupils and remake them in their image."¹⁴

The talented teacher has little personal need to be the control, the authority. He maintains control through mutual respect. But here the authority is in the process itself, in the limits set by the whole cooperative relationship—limits which are not personal but objective and out-

¹³ Reprinted from *The Teaching-Learning Process*, by Nathaniel Cantor, by permission of The Dryden Press, Inc., copyright 1953 by The Dryden Press, p. 183.

¹⁴ *Ibid.*, pp. 144–146.

side the person of the teacher. Personally, the talented teacher possesses enough maturity and self-understanding to be able to deal with students without wearing a sign reading, "Mr. Authority-Figure." Cantor writes further, "If the teacher gains increasing inner security, she can afford to be rejected. . . . She does not need the others' support for reassurance. She does not have to control the others since she learns to criticize and control herself."¹⁵ Here, then, is the teacher's first responsibility—to understand himself, and to know whether he needs reassurance through being the authority and thus requires the obedience of his students, or whether he finds in teaching the kind of relationship with students in which he gains their respect because he teaches them.

The teacher cannot be responsible for meeting every need of every student. He must teach by relating needs of young people to his units or core subjects, thus meeting many, though not all, needs. Furthermore, even the talented teacher will help some students to think far more surely than others. If he fails with some youngsters, he must have enough self-confidence and enough equanimity in a good conscience so that his failures will not unnerve him. As we said at the beginning, the responsibility of the teacher is to teach, and, as far as possible, to teach every individual in his class. But Joey, who is highly disturbed, and Sammy, who is retarded, and Pat, who taps his fingers and closes his ears, may remain failures. Nevertheless, the teacher is responsible for teaching and for continuing to teach even Joey and Sammy and Pat. And he will sense something of the wonderful feeling of the father of the Prodigal Son on the day that one of the three comes alive, receives enlightenment, and thereafter begins to learn.

(Answers for *Responsibility*: Yes—1, 4, 5, 7b, 8; No—2, 3, 6, 7a.)

It is you, then, who are the core of the classroom. It is your self which determines in large degree which ideas about method of teaching you can adopt and make part of yourself and which you must reject because they do not coincide with your basic beliefs. You cannot separate your self from your teaching. It must be part of your examined life. Know what you believe, what you value, which ideas you believe so strongly that you desire to pass them on to others, how much need you have of others' support. Know your self and be sure that your teaching method coincides with you and your other beliefs.

¹⁵ *Ibid.*

A Professional Person

The teacher, then, is you, the special self, the unique individual. He is also a member of a profession, and his relationships to his profession are an important consideration. The professional requirements of teaching may be divided into personal broadening, recording of discoveries, and establishing human relations.

Broadening. An individual who is broadened is a better teacher. "Give me fullness of life like to the sea and the sun; give me fullness of physical life, mind equal and beyond their fullness," wrote Richard Jefferies. The life which is narrow, prim, without daring, perfectly secure, is not the broadened life. Teachers who know something besides their own brick domain at school and their own few small rooms at home are able to arouse anxieties in students, to offer experiences, to see the possibilities for every learning experience in problem solving much better than those whose lives are not so enriched. A talented teacher gets out into the world and comes to know the world. His search is never ending, but many avenues are open to him.

The means to broadening will vary. A teacher should be a member of a community and of community life. How different parents and administrators and other teachers seem at a local square dance, or with their heads bowed in prayer at a local church! How different the lives and experiences of students look as a teacher works and plays beside parents in a local election or in a national political campaign, beside groups of parents in a forum or study group, at a pep rally for the Little League, or at a bridge party! If a teacher's life is sheltered from these experiences, his ability to stimulate anxiety in students and to understand the ideas which they hear at home is limited.

Broadening includes also reading and reading widely. Our suggestion is not for a few "good books" to while away a quiet evening at home, but for a planned and ever-continuing program. Teachers find broadening in reading or rereading classics, in reading new novels or histories or dramas, and in reading the local newspaper and the current magazines that their students read. Here is a whole picture of lives being lived, long ago or at this moment, which can awaken teachers more acutely to the needs of men and women in all of life's problem areas. It is necessary to keep up with current events—local, national, and international. A broadened person knows both the world and the people in it.

Teachers take courses, sometimes, unfortunately, just for an increment in pay. But courses, too, are broadening. A teacher of English may broaden his experience by taking a course in chemistry as a way of learning about an area of knowledge with which he has had little acquaintance. Teachers sometimes join professional organizations and subscribe to professional journals, and though they may do so for the sake of being counted, they find in the contacts many opportunities for broadening. And not to be ignored is the great broadener, travel, even travel not far from one's home. Here again is the opportunity to see and observe people, to become more acutely aware of man's constant effort to mold life to his needs.

Forming hypotheses and judgment about one's own area of specialization is a vital part of broadening, based on reading, study, and research. A superficial kind of learning of the material and ideas one will teach may spell the road to failure. A broadened person has acquired many facts and opinions about his special field, and he is constantly replenishing his store of knowledge and deepening his wisdom by reading.

As a further step to broadening, the teacher must be assured of evaluation of his work as a teacher. Some discussion of this consideration has been offered in the chapter on evaluation. Tape recordings are an objective form of evaluation, whereby the teacher may hear his speech and tone of voice, as well as what he really says. Some form of student evaluation, such as rating scales or freely written responses, should also help in self-evaluation in teaching. Finally, in this area, the teacher should observe in his colleagues' classes to keep himself aware of other technics and approaches which he may examine and possibly adopt.

Writing. There is no doubt that a teacher learns from hearing or observing the experiences of other teachers. If he were to write down his own experiences in teaching, the little things or the basic philosophy of value to him, a broader kind of sharing would be possible. As he learned to record his experiences, the talented teacher would examine his own methods with a more critical eye. He would discover the areas where he needed, perhaps, additional research in order to change or perfect his approach. Mrs. Y liked to write down experiences in teaching which she had found valuable; and as she revised the stories and critical comments, she realized they could become publishable. With this in mind, she wrote a description of a project undertaken by her

class in mathematics—a study of a group of art objects and paintings according to mathematical relationships and dimensions. Her final article was published, and thus her time and effort served to spread an idea among many teachers of mathematics.

As a result of this experience in teaching her classes, Mrs. Y spent time doing research in the field of the relationships between mathematics and art, and in one advanced class opened a discussion with the quotation from Edna St. Vincent Millay,

Euclid alone has looked on Beauty bare.¹⁶

As a result of Mrs. Y's research the class discovered new anxieties leading to critical thinking. Again she recorded her discoveries for other teachers of mathematics.

Writing, then, as a professional pursuit, is a way that "leads on to way." The teacher helps other teachers with ideas which have proved helpful and useful; he helps himself with new information and attitudes, which in turn may be offered as a help to students in arousing anxiety and in finding new means to solve problems. If his material is not assured of publication, the teacher may take it to his former professors as a way of keeping them aware of his professional pursuits. At the same time, they may be able to aid him in improving his writing so that it will be publishable.

Relating to Others. There is no mysterious formula by which the talented teacher establishes good relationships between himself and his supervisors or colleagues. Such good relationships evolve from a simple, yet subtle, attitude within the teacher himself. We have discussed already the need for the teacher to feel with his students. The same is true of supervisors and colleagues, of parents and other associates. Putting oneself in the other person's place, getting inside his heart and his feelings for a moment, will bring the enlightenment which changes a strained relationship to a satisfying one. A professional person must establish good relationships with everyone, a not difficult feat when he remembers to feel with others. The principal is "hard, obstinate, proud, unyielding, self-righteous, narrow-minded, not understanding, not educated in modern practices, not democratic," and so on. But to the talented teacher as a professional person, "the principal feels worried

¹⁶ *Collected Sonnets of Edna St. Vincent Millay*, Harper & Brothers, New York, 1941, p. 45.

that the teachers do not maintain discipline," or, "the principal feels pressed by the superintendent and the parents and the school board to see that students achieve high scores on the College Boards," or, "the principal feels tired out with so much responsibility." Note how the removing of labels, the attempt to get inside another's feelings, causes a complete change in the feelings of the one who makes the comment.

The talented teacher, therefore, engages in no school gossip which tags everyone with labels. He tries not to think in those terms, but in terms of the other person's emotions. This attempt to feel with others is a step which makes the real practice of the Golden Rule far easier. Feeling with colleagues is no different from feeling with parents or with other community members; it means a subtle change in attitude toward others which will result in good relationships. Even the shy and retiring teacher, the new and unsure teacher, will discover that sympathy with others opens many doors to understanding between him and them.

The teacher as a professional person, then, thinks in terms of broadening himself, of offering his ideas to others, and of establishing good relationships with all those with whom he has contacts. He finds that none of these goals makes difficult or mysterious demands, but that each one requires self-discipline and effort on his part. Unless the teacher has anxiety about these areas and defines his problem in terms like the question, "How can I go about broadening my experience, offering my ideas to others, and establishing good relationships?" he will not then move ahead to become a professional person.

Common Mistakes of a Beginning Teacher

The new teacher today is far better than he used to be because he takes with him a solid foundation of hypotheses and judgments for himself in his new role. But in spite of his background, he must expect to make a few mistakes. We discuss here some of the most common mistakes of the beginning teacher, based upon extensive observation of new teachers at work.

Large Omissions. There are two large omissions of a neophyte teacher. The first is that he does not seek help and advice from superiors when he experiences trouble. The teacher in his first position may think that he is expected to know all the answers, but his super-

visor or principal holds no such expectations. The supervisor knows from long experience that the teacher will encounter difficulties; and he knows, too, that if the teacher asks for help and suggestions quickly, many heartaches are avoided. The supervisor expects to offer help when the teacher finds himself involved in a situation which he cannot handle adequately. To avoid asking for help early is harmful to everyone concerned—to the new teacher who must suffer through his inadequacy, to the students who bear the brunt of inexperience, and to the supervisor who must spend far more time extricating the teacher from deep difficulty than from a small problem.

The second large omission of the beginning teacher is that he shies away from originality and creativity in teaching even though his judgment tells him to be more daring. A new teacher may feel strange in the classroom for the first time, and say, rationalizing to himself, "I'll just start out in the old recitation way of teaching until I get acquainted, and then I can switch to what I know is right and far better." But somehow the time for the change never arrives, and the new teacher fights a constant battle with himself. Should he teach conventionally, without imagination and creativity, or should he take a firm stand for what he believes in? This postponement of decision may lead to perpetual unhappiness for a teacher. He must begin at the first minute of the first day to teach as he believes he should. Only then can he test his hypotheses and judgments and thus follow the road which leads to talented teaching.

The large omissions result from one cause—the teacher's fear of appearing to be a failure, the desire to pretend that he knows all the answers. Mistakes, wrong turns, are not the signs of the failure but the signs of the new teacher who attempts to arrive at judgment about how to improve.

Large Failures. In addition to his large omissions, the new teacher often finds himself involved in three large failures. The first is failure to see the relationship of what he is teaching to other courses. Although he says that education is a total process which aims to teach the whole child, the new teacher often closes off this idea when he closes his classroom door. In those forty or so minutes, he is king in his own isolated little domain, and he does not consider the rest of the students' courses. This failure may be overcome by the new teacher if, as we described in the chapter on planning, he talks to other teachers,

discusses what they are attempting to accomplish, and asks where his teaching may aid them.

The second failure of the new teacher is in not showing that he cares about what he is teaching and that he enjoys being a teacher. Personal enthusiasm for the ideas under discussion and for the position of teaching kindles many a flame in students who otherwise might sit through a course of study with little or no learning. The new teacher who is not afraid to present a good "sales talk" about his area of specialization, about things in a given unit which he really cares for, about teaching itself, will find that he tells not only his students but himself. He is unlikely to say, as some teachers unhappily do, "Yes, I teach social studies. It's a living." When he is discouraged or weighed down with too much work, he might stop to think of the workman who told the passerby, "Yes, I lug stones all day. It's a backbreaking job," whereas his coworker, when asked about his job, said, "I am building a great cathedral which will change the lives of many men." How much more is the teacher building!

The third failure of the teacher is in not giving freely of his time. Teaching is a professional position. It does not squeeze itself into a certain number of school hours plus a half-hour before and after. The new teacher who fails to give of his time until he knows that he has offered all possible benefits to his students is actually failing to do his job, for he is not really teaching. A new teacher may need to work many extra hours, and his criterion must always be, "Am I really teaching? All that I can, as well as I can, and as many as I can?"

These three failures of the beginning teacher occur because he holds himself back, fails to try to feel with others, and fails to see himself as a professional person. If he gives of himself, he is both a better self and a better member of a profession.

Small Lacks. We offer here a few additional suggestions, which may seem picayune; yet, taken together, the things they criticize can produce an uncomfortable sense of lack of poise and confidence in the new teacher.

One difficulty comes from dressing poorly. Dress as carefully and stylishly as though you were going somewhere important. Students, strangely enough, notice dress; they spend much time looking at the teacher. Taboos about dressing with taste and style no longer exist; a good teacher always looks attractive or well-groomed.

Talking to the blackboard or the students who are nearest is another irritating habit. Project your voice. Look at the whole group of students, or look at them individually if you address one at a time. Everyone wants to hear the teacher; he promotes the feeling that he cares about students if he looks, not at the floor, but always at them as he speaks and as he listens.

Confessing inexperience may be embarrassing to a class. Do not tell your students how little you know or that you have never taught before. Do admit, of course, if you are asked, that you do not have an answer. Nothing makes a group more uncomfortable than a leader who declares his inexperience, unless it is a leader who pretends to know everything. A teacher must be flexible.

Not calling students by name is a tactless blunder. Be sure to address each one by his name each time you speak to him. Find out the name or nickname he prefers and use it. Again the teacher promotes a sense of understanding, of caring for individuals, if he is careful to use names and not a pointed finger.

Leaving erroneous information on the chalkboard may cause a misunderstanding. Always erase or correct it. Students, staring at an error, may remember it and later forget completely that the error was corrected orally.

Standing behind the desk gives an impression of insecurity or aloofness. Do not use a prop; use your own feet for support. Students sense that the teacher is a remote authority when a large bulky desk stands between him and them. The teacher who moves among his students is better able to promote cooperation.

Using slang or large words precludes sympathy and cooperation. Once in a while, for emphasis, slang is permissible, but it should be used sparingly. Watch out for what secondary school students call "college" words, and try to phrase everything simply. The teacher who speaks in correct form sets an example for his students. On the other hand, if he uses a difficult vocabulary, what he says is lost upon his students.

All of these mistakes of beginning teachers are discussed as suggestions in addition to other matters already covered in this book. Errors may occur in understanding students, in being able to arouse anxiety, in helping students to think, in planning, disciplining, evaluating. It is hoped that the method of teaching for critical thinking will serve to

eliminate mistakes, and will set the teacher upon a well-paved road to success.

* * *

The teacher as a self and as a professional person is in no way Dr. Jekyll and Mr. Hyde. The teacher's basic personality is merely blended with his professional role, to become a part of the totality which is an examined life. His effect on the lives of the young people of the world is so great that he should be just a little humble about the thought. Yet sometimes, in spite of the knowledge of his tremendous influence, the teacher fails to make an examination of himself or to admit to himself that his personality is the center of his classroom.

We hope that the teacher has arrived at hypotheses and judgment. Although he knows very little of self, effort and discipline and desire for better self-knowledge will have their great effects in better experiences for the present and future lives of many, many individuals.

LEARNING MATERIALS

Tests

We suggest here several standardized tests that should aid the teacher to understand himself in terms of interest, personality, general knowledge of education, and proficiency in his special subject. A test or series of tests will not, of course, offer final answers to questions in these areas; the test results should be discussed with professors or qualified counselors. Since the facilities for testing vary according to institutions, we suggest a minimum program and a more extensive program where more extensive testing and counseling are available.

General Tests. One of the following general tests should assist a prospective teacher to judge readiness for the classroom. The National Teacher Examination is given twice a year in February and during the summer. The Teacher Education Examination may be taken at any time during the year, but group arrangements must be made by the president, dean, or department chairman of the college.

1. The Teacher Education Examination, published by the Educational Testing Service, 20 Nassau Street, Princeton, New Jersey. Part I—The General Professional Examinations; seven parts: foundations of education, child development and educational psychology, guidance and measurement, instructional methods, English, general culture (part 1—history, literature, fine arts; part 2—mathematics and science). Total time, 185 minutes. Part II—Teaching Field Tests; individual tests of 80 minutes each. The candidate may take one or two of the following during one session: early child-

hood education, elementary school education, English language and literature, social studies, biological sciences, physical sciences, mathematics, French, Spanish, industrial arts, physical education.

The cost of this battery of tests is five dollars for Part I and one test from Part II or six dollars for Part I and two tests from Part II. It is given only in groups.

2. The National Teacher Examinations, published by the Educational Testing Service, 20 Nassau Street, Princeton, New Jersey. Part I—Common Examinations; five parts: professional information, English expression, social studies-literature-fine arts, science and mathematics, nonverbal reasoning. Part II—Optional Examinations; eleven separate examinations in the following fields: education in the elementary school, early childhood education, biology and general science, English language and literature, industrial arts education, mathematics, chemistry-physics-general science, social studies, physical education, business education, music education.

The cost to full-time students for the Common Examination, with or without one optional examination, is seven dollars; with two optional examinations, nine dollars. For others it is four dollars more.

A Minimum Program for Personality and Interest Testing. Here are two tests to be taken in addition to the General Test for a minimum self-appraisal by standardized tests.

1. The Adjustment Inventory by Hugh M. Bell, Stanford University, Stanford, California. Measures personality adjustment in four areas on the student form (home, health, social, emotional) and five areas on the adult form (the same plus occupational). Takes about twenty-five minutes and may be self-scored.

2. Kuder Preference Record-Vocational by G. Frederick Kuder, Science Research Associates, Chicago. Form C measures vocational preferences on eleven scales (mechanical, computational, scientific, persuasive, artistic, literary, musical, social service, clerical, outdoor, plus verification score). Takes forty to fifty minutes and may be self-scored.

A More Extensive Program. In addition to all of the above, where facilities are available, the following might be taken.

1. The Personality Inventory by Robert G. Bernreuter, Stanford University, Stanford, California. Measures six areas (neurotic tendency, self-sufficiency, introversion-extroversion, dominance-submission, confidence, sociability). Difficult to score by hand. Takes about twenty-five minutes.

2. Study of Values: A Scale for Measuring the Dominant Interest in Personality, Revised Edition by Gordon W. Allport and others, Houghton Mifflin Company, Boston. Gives six scores (theoretical, economic, aesthetic, social, political, religious). May be hand-scored. Takes about twenty minutes.

3a. Vocational Interest Blank for Men by Edward K. Strong, Jr., Stanford University, Stanford, California. Measures vocational interest in forty-seven occupations and/or six occupational groups. Cannot be hand-scored. Takes about forty minutes.

3b. Vocational Interest Blank for Women by Edward K. Strong, Jr., Stanford University, Stanford, California. Measures vocational interest in twenty-eight occupations.

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16

Stars for the Student

Young people who learn through the method of teaching suggested here for critical thinking acquire a number of good things besides the ability to think about the subject matter of courses and about conduct and action in class. All of these good things may not touch every student all the time; yet many of them are readily attainable. Sally engages in critical thinking because the teacher has caused a coalescence of her adolescent needs with his own aim for thinking. Within Sally's vision gleam many bright stars such as self-understanding, respect for the rights of others, enthusiasm. As Sally learns, she is able to see many of these stars more clearly. They are by-products of learning.

The stars become visible as a result of special attention to them when they are discovered naturally as the teacher promotes critical thinking in all classroom experiences. The stars represent, then, our

learning about areas other than subject matter and class action. Their light reaches students only if the teacher helps them to see that they are there. Too often teachers and educators generalize, "If pupils study Latin (or algebra or grammar) they will learn to value their culture," or "If pupils study Shakespeare (or Wolfe or Donne) they will learn appreciation." Research does not justify such conclusions. Therefore the accomplished teacher attempts directly to promote learning about certain stars or values which he believes should be part of a student's education in school. His naming of values will be unique; it is important only that he hold them in mind, and as occasions arise naturally in the study of algebra or Latin or Shakespeare, that he phrase questions about them. Each teacher should find his own values; we have chosen the following, all of which the student can learn: self-understanding, use of inherited culture, appreciation of art, understanding of his place in living and learning, and understanding of the value of education.

A help to the teacher is to list such values and their subdivisions, and then to review the list at times to make sure that he asks direct questions about the values whenever he has an opportunity. Such opportunities should arise naturally if the teacher employs the method for critical thinking. If he takes advantage of these openings by formulating probing questions, the student then sees that he has new problems; and when he feels anxiety, he may move ahead to thinking. For example, through a probing question from the teacher, he might feel anxiety about his ambivalence and discomfort in the thought that he wants to be dependent and independent at the same time. With his anxiety aroused, he should proceed to formulate his problem and to think about it.

In the art class, Mardy always asked the teacher what to draw, but when he suggested that she shade some roses in deeper hues, Mardy asserted her independence. The teacher asked, "Do you like me to tell you what to do when you're deciding what to draw, but not to make any suggestions about your drawing once you have started it?" With numerous questions like this, Mardy began to see herself as sometimes dependent and sometimes independent. Feeling anxiety, she formulated a problem, "Which should I be? Should I be first one and then the other, or can I be both at once?" Even if the teacher had not asked these questions, Mardy might still have solved her problem and

thus gained the value of understanding her interdependent role; on the other hand, she might have missed it.

Critical thinking should offer all the opportunities needed for emphasis upon the values the teacher chooses. It is, of course, obvious that different areas of study necessitate emphasis on one value more than another. Furthermore, we do not imply that the classroom is the only life experience in which these values are available but simply that the class offers one situation where such learning may be experienced.

Learning about Self and One's Relationships

The first value for the student is learning about himself and his relationships with others. The self and its relationships are, of course, closely intermingled.

. . . to thine own self be true,
And it must follow, as the night the day,
Thou canst not then be false to any man.

As the student understands what he really needs and why his actions do not always harmonize with his asserted ideals, he learns what he honestly believes he ought to do, and becomes true to himself and therefore to other people. Even a spark of such enlightenment is worth while.

The teacher will learn to recognize likely means and occasions for emphasizing the understanding of oneself and one's relations to others. He may arouse anxiety when the student wonders about the worth to him personally of what he is about to study, and may help the student form judgments when he reviews this question. He may intensify student experience through his own understanding of motivation, which helps the student to evaluate his avowed goals. In situations involving classroom discipline he helps the student consider what he ought and ought not to do. But learning about oneself and other people is perpetual, and the talented teacher emphasizes the close relationship of self-understanding and learning. Thus the responsibility of the teacher lies, not necessarily in teaching directly about self-understanding, but in taking cognizance of its importance to the student and in letting

emphasis fall naturally upon it as he teaches. He thinks of several things a person must learn if he wants to acquire self-knowledge, and as occasion arises, phrases direct questions about them.

One aspect of knowing oneself is to realize inner needs and desires, reasons for actions, as well as one's hopes and aims. The student must learn how others view him, and also to accept himself as he is and to feel that he is a worthy person. Such understanding of self will ward off serious maladjustments and help the student to be a happier, more direct, individual at all stages of his development.

Sample question the teacher might ask about understanding oneself in a high school biology class: "George, does studying this frog make any real difference to your understanding of your physical self?"

In twelfth-grade English: "What ideas do you find for living your life from studying about Herman Melville?"

In thinking of the student's relationships, Nathan Pusey wrote that education "must help each student to *find himself* as an individual; then it must help him to *lose himself* in interests, causes, and ideas larger and more enduring than he."¹ Although Pusey speaks of a college education, something of this same value, though perhaps to a lesser degree, should reach students at the high school level. It is not enough, then, for the student to learn to understand himself; he must also discover that such understanding leads him to lose himself in doing things which are great and worth while.

Sample question about finding and losing oneself after studying biographies in eleventh-grade English: "Beth, if you were a talented musician like Albert Schweitzer, would you follow your personal desires for music or abandon them to follow what you felt you ought to do instead?"

In college preparatory chemistry: "Jack, you are spending lots of time in and out of school on these experiments in synthetics. It's good to lose yourself in work, but I wonder what some of your reasons are for doing it."

An adolescent also needs to understand his uniqueness. We have said that he wishes to be like his peers, and that any sign of difference is often intolerable to him. But if he thinks and understands himself and his relations to others, he will appreciate not only that he is like

¹ Nathan M. Pusey, "What Is College For?" *This Week Magazine*, June 9, 1957, p. 2.

others but that he is a unique creation, just a little different from others. With this dawning realization, his own inner creativeness should unfold because he no longer fears differing from others on some occasions. He develops no ambivalence about this new insight, but merely accepts himself as both unique and a part of *Homo sapiens*.

Sample question about uniqueness in world history: "Howie, in trying to be like the group, are you going to back down on your original idea that there is much to be said for the old Confucian society where everyone had his place?"

In ninth-grade English: "Sally, the poetry you write shows much more creativity than that of most ninth graders. Are you willing to keep working and develop this ability in spite of the fact that most of the class doesn't care for poetry?"

The adolescent, we have said, is often ambivalent about growing up, desiring sometimes to be a child and at other times to be adult. As he learns in an atmosphere of cooperation, he begins to understand that he need not be ambivalent, fighting with himself, swaying first one way, then another. He realizes that he may be both dependent and independent at the same time. He accepts the fact that in some experiences one depends on other people, but that in others one may stand independently and allow others to be dependent upon him. With this understanding, the individual moves closer to real acceptance of himself.

Sample question about the need for interdependence in junior high arithmetic: "We can often get ideas and help in math by working with someone. At other times perhaps we can do better problem solving by ourselves. Do you think it is all right to ask help when you can't see the solution yourself?"

As the student gains success in solving problems, he gains also more confidence in himself, and thus learns to feel better about things. The effect of this new confidence is that he gains the feeling that things in his life are all right, that he has the ability to meet personal problems. Thus, though he must meet some of them by facing the fact that conditions will not change, he becomes able to face this very fact; or the problems recede from his consciousness, and he realizes they were only nebulous worries, no longer needing definitions and solutions.

Sample question about feeling happier in a civics class: "Carlos, you have done well in finding a solution to your problem about immigrant

families. Could your way of solving it help in the things that are bothering you right now?"

In twelfth-grade college English: "You have looked over your themes and learned something about what to do the next time you write. Have you gained any feeling of confidence by what you have done?"

Whenever possible the teacher asks many questions which relate the subject of study to the possibility of understanding self and one's relations to others. From time to time he might note down instances where he has helped students to develop such self-understanding.

Learning in Relation to Culture

Currently certain writers criticize modern education because, they say, it fails to pass down our cultural heritage. The student will obviously learn something of his culture from his studies, but he will undoubtedly learn only that part which his school system deems important. He will learn more if his teacher emphasizes the value of culture by phrasing pointed questions about it. "Culture is the continually changing patterns of learned behavior and the products of learned behavior . . . which are shared by and transmitted among the members of society."²

There is little point in stating that students must learn about their inherited culture unless one asks, "Learn about it for what?" One of the most important reasons for learning about one's culture is that one may use the ideas in living. The student who is helped to know what others before him have thought about the very problems which he faces will utilize their ideas to help solve problems. The talented teacher never insists that a student adopt the solutions to life found by great men in the past, but he helps the student to understand their solutions and to consider them as a possibility for the present. He also helps the student to evaluate his culture and if possible to formulate hypotheses and judgments about changes he deems admirable.

Sample question about using one's understanding of his culture in a junior high core study of problems of adjustment in modern society: "People in our society always eat three meals a day, we said. Some of

² John F. Cuber, *Sociology*, Appleton-Century-Crofts, Inc., New York, 1947, pp. 49-50.

you feel the old hermit we read about, who eats only once a day, is queer. Do you think we ought to try to change him?"

In United States history: "We have seen that Jefferson believed that education should cultivate an awareness of the present so that men use their resources of reason. If he were living today, how would he feel about the education you are receiving?"

In high school English: "Pete, you have told us about 'Ozymandias' and the fact that the poem shows that Shelley believed that the great works of a cruel king come out as they should when 'nothing' besides remains.' Does his belief tell us anything about living our life and solving our problems? You remember that some of you have said that you hope to build great things in your life."

It is not enough to study a culture. The study must include, also, a consideration of the manner in which other people derived their answers and solutions to their problems and a comparison with the way in which the student solves his. This penetrating study should conceivably help him to find more useful and careful solutions in a more orderly fashion.

Sample question about how knowledge is derived in a physics class: "Wendy, you have told us what happened when the apple hit Newton on the head, and you said that from this he found the law of gravity. Now was this his way of discovering knowledge?"

In an algebra class: "When we were working with triangles, I gave you some formulas to help you solve problems. In the study of circles you made your own. Which approach gives the greatest knowledge and understanding? Which one will help most in the future and why do you think so?"

The talented teacher does not teach as though he believed his course of study the only one in the curriculum or the most important. He indicates that he values it, but at the same time he demonstrates its relation to other areas of study so as to emphasize relationships among areas of knowledge. In an English class a student may read Shakespeare at the same time that he studies Elizabethan England in history. Inexperienced as he is, he may fail to relate the two studies, and therefore the teachers help him to do so. In a core curriculum plan, of course, such relationships are far more obvious than in a curriculum where each course is a separate unit. The student, as he begins to understand relationships, begins to realize for himself the interwoven pattern of knowledge.

Sample question about relationships of knowledge in geography:

"We have been studying the geography of southern France. Have you ever studied anything else which relates to this?" If they fail to express relationships, the teacher tries to make the students aware of them by mentioning them himself. Students of Latin may have read of Caesar's invasion of France; students of French may have studied the land or read Daudet's stories, set in southern France; students in English may be familiar with Shakespeare's account of Henry V's campaign in France.

Most of the questions in this second area will occur at steps 4 and 5 of problem solving and in forming judgments, and they will include the intensifying of student experience through motivation by emphasis on student goals and values.

Learning Appreciation

"Every act of appreciation is in part a sympathetic re-creation of the artist's meaning, in part an expression of the critic's own creative personality,"¹ writes Flaccus. And in another place, "The double process, then, of creating and moving within a world of semblance, and of enriching the images and shapes of that world with our psychic wealth yields the meaning of aesthetic experience."² The third value—appreciation—will come if the teacher shows the student where to look.

Appreciation will arise almost spontaneously at any point during problem solving. In an art class, students may consider the problem, "How can a triangle be used effectively in painting?" Working on this through his own painting plus a study of famous paintings, such as Rogier van der Weyden's "Portrait of a Lady," at any point a student may wonder, "What does this painting mean?" As he finds himself in the artist's world, he senses a meaning in that world. Here more than in other areas, his hypotheses and judgments are in large part emotional, though the student will be able to explain them to a certain extent in verbal terms.

As the student works through critical thinking in any field of art—music, poetry, drama, painting—he learns to experience the art. He

¹ Louis W. Flaccus, *The Spirit and Substance of Art*, F. S. Crofts & Company, Inc., New York, 1941, pp. 55-56. Reprinted by permission from Appleton-Century-Crofts, Inc.

² *Ibid.*, p. 66.

enters into a world of semblance and arrives at empathy with the artist. In so doing, he gains an understanding of what it means to appreciate art.

Appreciation means, too, that the student expresses his own emotions as he considers an art form. As he puts himself into a reaction to the art, he begins to realize its value. It is to be hoped that this appreciation will carry over to later life.

Sample questions in the arts:

"Barbara, what is the painter trying to give us here? How does he get his idea into artistic form?"

"Amy, how is the world of this painter different from the real world?"

"Robin, what is the spirit of this poem? Can you get into that spirit and share it?"

"Ezra, can you hear the melody when it is repeated? Can you catch the feeling?"

These questions should aid students to define personal problems in relation to appreciation of art forms and to move on to finding a value in them which will be lasting. It is obvious that the teacher who teaches such forms must understand what he himself means by appreciating them.

Learning One's Place

The student may inadvertently be given the impression that his education and his life are experiences which are owed to him. But he must learn that receiving things of value presupposes a responsibility. "As teachers we must assist every individual youngster to understand that he is his own master, saying and explaining at every opportunity that what is provided may help produce, but cannot alone produce, his happiness, that 'nothing can bring you peace but yourself.'"⁵ The student who realizes early that every privilege means that he assumes a responsibility will indeed be close to discovering his own happiness.

In each step of the process of critical thinking, as the teacher emphasizes the importance of the process and deemphasizes a final result, the student should be helped to learn his place in that process

⁵ Jean Wellington, "Let the Pupil Do for Himself," *The Clearing House*, vol. 31, pp. 520-522, May, 1957.

and to assume his rightful responsibility for its success. With the teacher's understanding of intensifying learning through careful emphasis upon the broad approach, and with emphasis upon evaluation (both of which help the student to estimate his own progress), the teacher helps the student to find his place. In the regular classroom experiences the teacher again helps the student to consider his importance in the situation, and as he does, discipline problems should lessen. Thus in everything that occurs in the classroom, the student forms hypotheses and judgments about his own function in his education, if the teacher is careful to ask questions which arouse anxiety in the matter. This is the fourth value.

The adolescent must learn responsibility for his own actions. A young child often looks around and successfully produces a scapegoat for his misdemeanors, or he turns accusingly and cries, "It's all your fault." As the student reaches adolescence, such a natural reaction must be left behind. When he begins to say, "Yes, I did it, and I wish I hadn't," or "No, I didn't do my share. I'm sorry I didn't," he learns that he, and he alone, must stand up to his sins and his omissions. This judgment of himself will lead him to more thoughtful action.

Sample question about assuming responsibility for oneself in high school French: "Perry, what do you think about reading the translation instead of the French version of *Le petit chose*? What did you want when you did it? What was your purpose in reading the book at all? Why do you feel that it was or wasn't the thing to do?"

The student who learns that "no man is an island," and that he may not live unto himself, thinking only of his own desires, is a far better member of a democratic society than a selfish child; and if he learns, too, that others have a right to their ways and their attitudes, he is a really good member of a democracy. If he never quite realizes that he has a responsibility to be his brother's keeper, he makes no contribution to his world. If he never learns to listen to and respect others, he goes through life without learning, and thus without assuming his democratic responsibility to improve his society.

Sample question about helping and respecting others in high school English: "Ben, since you have such a fine understanding of the meaning of Hamlet's soliloquy, what do you think you could do to help the rest of the group?"

In a high school business course: "Tell us, George, how do you feel

about your argument with Larry about the need for a business to have several separate checking accounts. Larry, you do the same. Have you found out anything about your problem or about each other from your discussion?"

Another important concept for a student to learn is to be willing to solve problems, make his own decisions, and then act upon them. Many people, both in school and out, find that solving problems, and then acting upon their decisions, is extremely difficult. They never outgrow the stage of peer-belonging or learn to stand for their beliefs. They do what the others do, not with conviction, but from fear of criticism. The student who learns to think critically has had good experience in forming judgments and often in acting upon them. This background gives him confidence to continue to solve problems and to act less fearfully upon his decisions.

Sample question about acting on decisions in algebra: "Ray, your solution to the graph problem differs considerably from that of the group. Will you defend your method of tackling this problem and show us why you think you are right?"

In a chemistry class: "Rose, you studied that question about how to produce water. Now you seem to want to wait for Frances to do the experiment and to state the conclusions. Do you find it hard to say, 'This is what I found out?'"

As the teacher intensifies learning through his understanding of motivation, he helps students to evaluate and to set thoughtful goals. Unexamined goals lead many individuals to grief. This is not to say that the teacher should determine what the individual can or cannot do, but that he should help him to decide for himself what he really wants. The guidance department which aids the student to evaluate his performance, past and present, and his potentialities should supplement the teacher's work in the classroom by helping the student in setting thoughtful goals.

Sample question about setting thoughtful goals in world history: "Nick, you said you are going to stop poverty in India where people die on the streets from starvation. Do you now feel you would try to help alone or through organizations like CARE, UNESCO, and church missions? Why do you want to help?"

In high school English: "After our study of writing newspaper articles, what do you think about being a reporter or sports writer?"

I'm thinking particularly of Jim and Steve who seemed to lean toward this type of work, and also Janet who has developed a new interest here."

• *Learning the Value of Learning*

The fifth value may be termed learning the value of learning. Brubacher defines value as "a good which has passed through the process of examination and evaluation."⁶ The talented teacher makes no attempt to determine that the judgments of students will coincide with the values he places on learning; he does, however, point up possibilities for consideration.

The student who says, "Shakespeare is for college professors; art is for people with horn-rimmed glasses and long necks; good writing is for other people" has obviously not learned to place value on what he has learned. The teacher who can emphasize again and again through careful questions the value of a study, asking whether a student would return to it again later and why, helps him to consider placing what he is learning in his hierarchy of values. If he continues to declare that Shakespeare is for college professors, the teacher smiles and keeps trying.

Sample question about valuing one's learning in studying American literature: "We have studied some of the works of Longfellow because school authorities and parents think he is important for you to know about and appreciate. Maybe you agree and maybe you don't. But what would you say has been the greatest value for you in studying Longfellow and particularly in reading 'Evangeline'?"

Students from other countries often speak of the great value they place upon an education which is not obtainable for many of their contemporaries. In this country, because education is so readily available, students often think it negligible. Abraham Lincoln so valued learning that he read each night from borrowed books with only the fireplace for a light. Students today too often find this story ludicrous. The teacher should ask them to consider why one values or does not value learning and education.

Sample question about valuing education in a general division in

⁶ John S. Brubacher (ed.), *The Public Schools and Spiritual Values*, Harper & Brothers, New York, 1944, p. 29.

United States history: "You girls seem to care very little about learning history. I know your prime interest is marriage. Do you think a married woman needs to know anything about the country and how it became what it is now? If you knew something about our history, wouldn't you make a better wife and mother?"

In biology: "Some of you look unhappy today. Do you ever stop to think about why learning about biology is worth while to the present and future health of America and how lots of other countries suffer where education on this topic is not available?"

Enthusiasm is another aspect of learning the value of learning. A great contemporary preacher often says that many men crawl through life on their hands and knees, failing to realize the wonders of life and its vast opportunities. The student who is apathetic toward learning, who finds nothing to fire him with zeal, may become the adult who crawls through life unaware of his own potentialities and of life's possibilities. If the teacher can help the student to value enthusiasm for learning, to learn to put all his energies into experiencing it, he may help people to walk upright through life.

Sample question about enthusiasm in advanced mathematics: "Josh, do you stop to think sometimes how many possibilities there are for solving the world's problems through mathematics? I watched you gain pleasure in real hard work when we studied the trigonometry to develop machines for tracking missiles fired into space. Do you sometimes remember the vital part trigonometry plays in the country's defense?"

* * *

All the stars, or extra values, for the student are really ways of meeting his needs. As the teacher stirs up anxiety in a student to learn about himself, his culture, his place, about the appreciation of beauty and the value of learning, he opens new avenues to him by which he can meet his needs. As a student learns to understand himself, for example, he learns to understand his urges and to realize that he must find ways to satisfy these urges acceptably. Or, as he considers how knowledge is derived, he finds a new avenue for success and security. As he wonders, in response to a teacher's question, what value a poem or piece of art has for him, he begins to see where it meets a need for belonging in the world or where it offers him a glimmer of

how to offer love or how it adds to human happiness; and here is the beginning of appreciation.

The values available to the student, then, are many. The teacher's attempt to coalesce adolescent needs with his aim for thinking sets the stage for gaining these values, that is, for learning in these areas. Once the student has defined a problem for himself, learning will become available insofar as his limited experience can lead him to hypotheses and judgments. These judgments he must make himself. The teacher tries to stand at the student's side as he follows through the steps of critical thinking, but he remembers that, as Emerson observed, "Though the wide universe is full of good, no kernel of nourishing corn can come to him but through his toil bestowed on that plot of ground which is given to him to till."

Thus the teacher understands the fine balance in the teaching-learning process. He sets the stage; he urges and exhorts the students to learn; and he leads them to learn through a method of problem solving and critical thinking based neither upon what the student needs, nor upon what someone says he ought to have, but upon a fine coalescence of the two. He knows that the resulting learning will be deep, a part of a new individual who is better because he has learned, for "Wise men lay up knowledge."

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Films on Teaching and Learning

The following films may be obtained from most university or state education department film libraries. Under no conditions should they be utilized without previews.

Accent on Learning, 29 minutes, Ohio State University.

Shows result of various teaching methods employed by instructors at Ohio State University. Chapters 6 to 11.

Age of Turmoil, 20 minutes, McGraw-Hill Book Company.

Shows behavioral characteristics and emotional reaction of early adolescence. Chapter 3.

Audio-Visual Aids to Learning, 13 minutes, Victor D. Solow for U.S. Army.

Development of a unit on Japan in an eighth-grade social studies class by the use of audio-visual aids. Chapters 7 and 12.

Broader Concept of Method, Part I, Developing Pupil Interest, 13 minutes, McGraw-Hill Book Company.

Compares teacher-dominated class with informal group discussion. Chapters 4 and 5.

Broader Concept of Method, Part II, Teachers and Pupils Planning and Working Together, 19 minutes, McGraw-Hill Book Company.

Shows group participation in reflective-thinking activities. Chapters 4, 5, and 6.

Chalkboard Utilization, 15 minutes, Young America Films.

Demonstrates and describes various uses of the chalkboard. Chapter 7.

Community Resources in Teaching, 19 minutes, University of Iowa.

Shows a social studies field trip and illustrates the value of outside speakers in a class. Chapters 7 and 11.

Discussion in Democracy, 11 minutes, Coronet.

Shows a class developing a program for leaders and participants in discussions. Chapters 6 and 10.

Experimental Studies in the Social Climate of Groups, 30 minutes, State University of Iowa.

Shows classical experiment on group behavior by Lewin, Lippitt, and White under autocratic, democratic, and laissez-faire leadership. Chapters 4, 6, and 10.

Feltboard in Teaching, 10 minutes, Wayne University.

Shows how to construct and use a feltboard in teaching. Chapter 7.

Field Trip, 11 minutes, Virginia State Board of Education.

A story of a biology class planning, conducting, and following up a field trip. Shows student committees in action. Chapters 7 and 10.

Importance of Goals, 18 minutes, McGraw-Hill Book Company.

A case study of Tommy, which shows the importance of goals. Chapters 5 and 13.

Instructional Films—The New Way to Greater Education, 26 minutes. Coronet.

An illustrated lecture on the use of educational motion pictures. Chapter 7.

Introduction to Student Teaching, 19 minutes, Indiana University.

Demonstrates how three student teachers learn about their school and pupils. Chapter 15.

Learning from Class Discussion, 11 minutes, Coronet.

Shows a class experiencing the discussion approach. Primarily useful to help a junior or senior high school class evaluate the discussion approach. Chapter 6.

Learning to Understand Children, Part I, A Diagnostic Approach, 22 minutes, McGraw-Hill Book Company.

A case study of a fifteen-year-old emotionally and socially maladjusted girl, and how her teacher diagnoses her difficulties. Chapter 3.

Learning to Understand Children, Part II, A Remedial Program, 25 minutes, McGraw-Hill Book Company.

Continuation of above case, showing how the girl improves as she develops an interest in art. Chapter 3.

Maintaining Classroom Discipline, 15 minutes, McGraw-Hill Book Company.

Shows discipline being handled from two approaches and the results of each. Chapter 13.

The Meaning of Adolescence, 16 minutes, McGraw-Hill Book Company.

Shows youth maturing over a period of about six years. Outlines the problems of a boy and girl in physical, social, sexual, religious, and moral adjustment. Chapter 3.

Meeting the Needs of Adolescents, 19 minutes, McGraw-Hill Book Company.

Depicts a family attempting to help their fourteen- and seventeen-year-old children develop mature attitudes. Chapter 3.

Motivating the Class, 19 minutes, McGraw-Hill Book Company.

Shows a student teacher realizing the importance of motivation in his mathematics class. Chapters 5 and 12.

New Tools for Learning, 20 minutes, University of Chicago.

Discusses the need for good tools in teaching, emphasizing the use of audio-visual materials. Chapter 7.

Planning for Personal and Professional Growth, 19 minutes, McGraw-Hill Book Company.

Compares the lives of four teachers, the problems they meet, and their success in solving them. Chapter 15.

Practicing Democracy in the Classroom, 21 minutes, Encyclopaedia Britannica Films.

Shows social studies teacher telling parents his way of leading pupils to work in committees and to plan their work. Chapters 10 and 12.

Principles of the Art and Science of Teaching, 49 minutes, State University of Iowa.

Presents a story of cooperative planning of a unit in eleventh-grade American history. Chapter 12.

The Problem Method, Part I, Defining the Problem and Gathering Information, 18 minutes; Part II, Using Information to Solve the Problem, 16 minutes, McGraw-Hill Book Company.

Title explains content. Chapters 2 and 14.

Problem of Pupil Adjustment, Part I, The Drop Out, 20 minutes; Part II, The Stay In, 19 minutes, McGraw-Hill Book Company.

First film shows why a boy leaves school because of useless learning. Part II shows how a school can reduce drop outs by stressing learning in terms of pupil interest. Chapters 5 and 12.

Promoting the Adjustment of Secondary School Pupils, 20 minutes, McGraw-Hill Book Company.

The classroom teachers assist students to solve their social and emotional problems and thus promote more effective learning. Chapter 3.

Scientific Method, 12 minutes, Encyclopaedia Britannica Films.

Presents the steps of the scientific method for use in many areas, including the social and physical sciences. Chapters 2 and 8.

Speech: Group Discussion, 10 minutes, Young America Films.

Shows ways of discussion and different types of small groups, including symposium, forum, panel, conference, and study group. Chapter 10.

Using the Classroom Film, 24 minutes, Encyclopaedia Britannica Films.

Presents a seventh-grade class using a film "The Wheat Farmer." How they prepare for and follow up the showing of the film. Chapter 7.

We Plan Together, 20 minutes, Teachers College, Columbia University.

Shows an eleventh-grade class planning together. Chapter 12.

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